THE PAPER INDUSTRY
and PAPER WORLD
AN EDUCATIONAL NEWS MAGAZINE — JUNE, 1944

JUN 17 1944
DETROIT

Satisfaction Guaranteed

In our business, we build satisfaction into our machinery — and know quite a lot about it. But here is something we *buy* that carries this quality to the ultimate.

The satisfaction you get from the regular purchase of United States War Bonds goes deep. It's the joy of a fighter when he hits the enemy hard. It's the warmth of duty well done. It's the finest feeling of good Americans working at home for Freedom.

Buy As Many War Bonds Each Month As You Possibly Can!

Richard L. Conaway
President

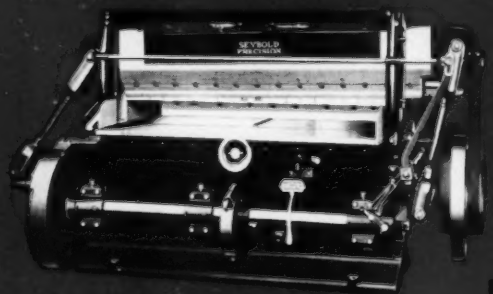
THE PATTERSON FOUNDRY & MACHINE CO.
EAST LIVERPOOL, OHIO

An Admir-able course of action
for Smoother Sailing Seybolds!

I'm the man
with the oiling can,
I never miss a day
In oiling bearings,
parts and clutch,
So give me right of way!

My job is this-
I must not miss
Adjusting clutch and brake.
A weekly chore,
not needed more,
But done for safety's sake.

My monthly trip
on this here ship
Is to inspect the clamp.
It must be tight
and working right
To keep Seybold the Champ!



SEYBOLD
• DIVISION •

HARRIS-SEYBOLD-POTTER CO., 823 WASHINGTON ST., DAYTON, F-7, OHIO

SEYBOLD SALES AND SERVICE

New York: E. P. Lawson & Co., Inc., 426 West 33rd St.

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BIG BENS ARE BUGLES IN THIS ARMY!

An alarm clock is reveille for the soldier on the factory front at Beloit. His lunchbox weighs less than a regulation army pack, but his determination to blast the Axis is as great as a scrapping Marine's! He knows that every precious man-hour is vital to Victory. He buys War Bonds regularly. He's part of the Beloit "army" with rolled-up sleeves. He's working to *win!*

Buy War Bonds for Victory!

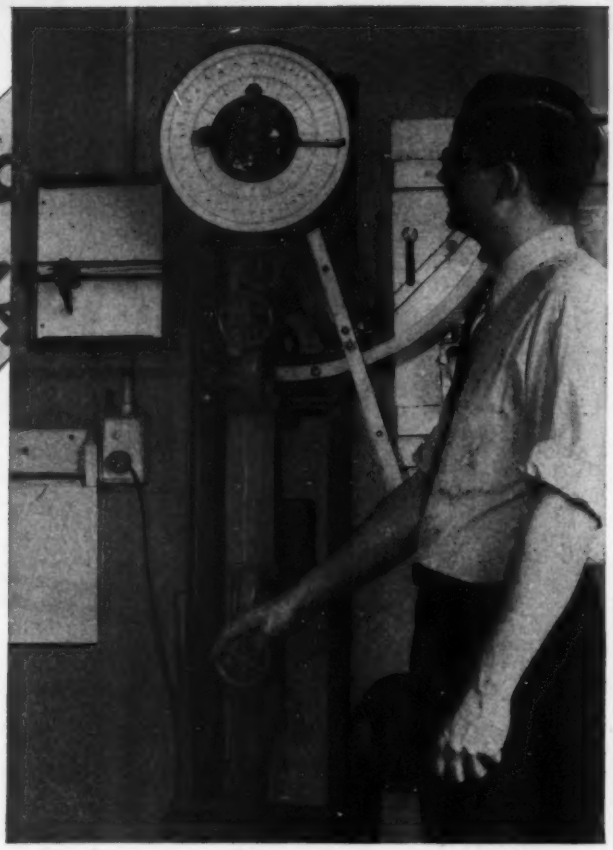
BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS. U.S.A. · SERVING UNCLE SAM · 1ST · FOR THE DURATION ·

BELOIT

BELOIT IRON WORKS, BELOIT, WIS.

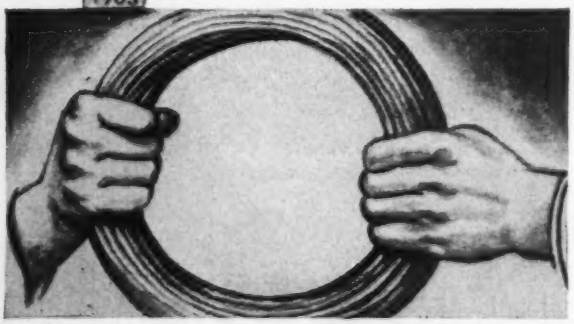
WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE!

We've Come a LONG Way



Yes, they were very skilful — the inspectors who tested our wire by hand back in 1903. Firmly twisting a coil of it told them astonishingly much about its quality and breaking point. Their careful work contributed greatly to the excellence of Lindsay Fourdrinier wire cloth in those days.

But — the human element was present. And the human element is always variable. The personal equation and the fatigue factor cannot be denied.



The autographic tensile testing machine above bars individual interpretations. It knows no favorites; is perfectly heartless. It "interrogates" the last strand in the afternoon as accurately as the first one in the morning. Its quantitative measurements are uniform and reliable.

Typical, of course. This is only one of many rigid laboratory ordeals which Lindsay weaving wire must pass before it goes to the loom.

THE LINDSAY WIRE WEAVING COMPANY

Serving the Paper Industry Since 1903

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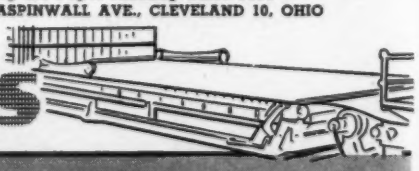
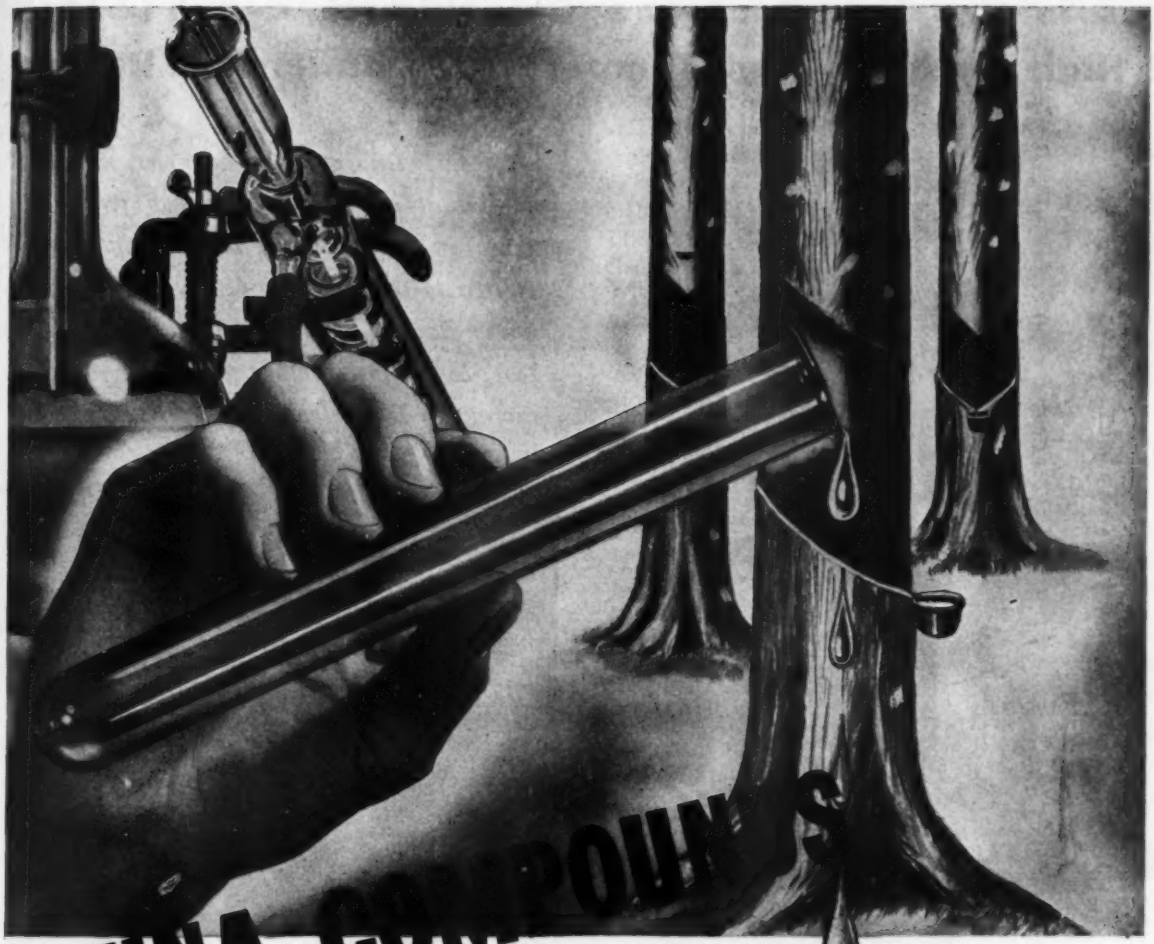


Lindsay WIRES

FOR PAPER MILLS



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for PAPER IMPREGNATION PROBLEMS

(Curing and non-curing stocks)

Longtime specialists in the fields of Combining, Coating and Impregnating Compounds, the UBS Laboratories are ideally set up to develop the particular Buna Compounds your operations require *Write today, describing your paper Impregnation Problems*

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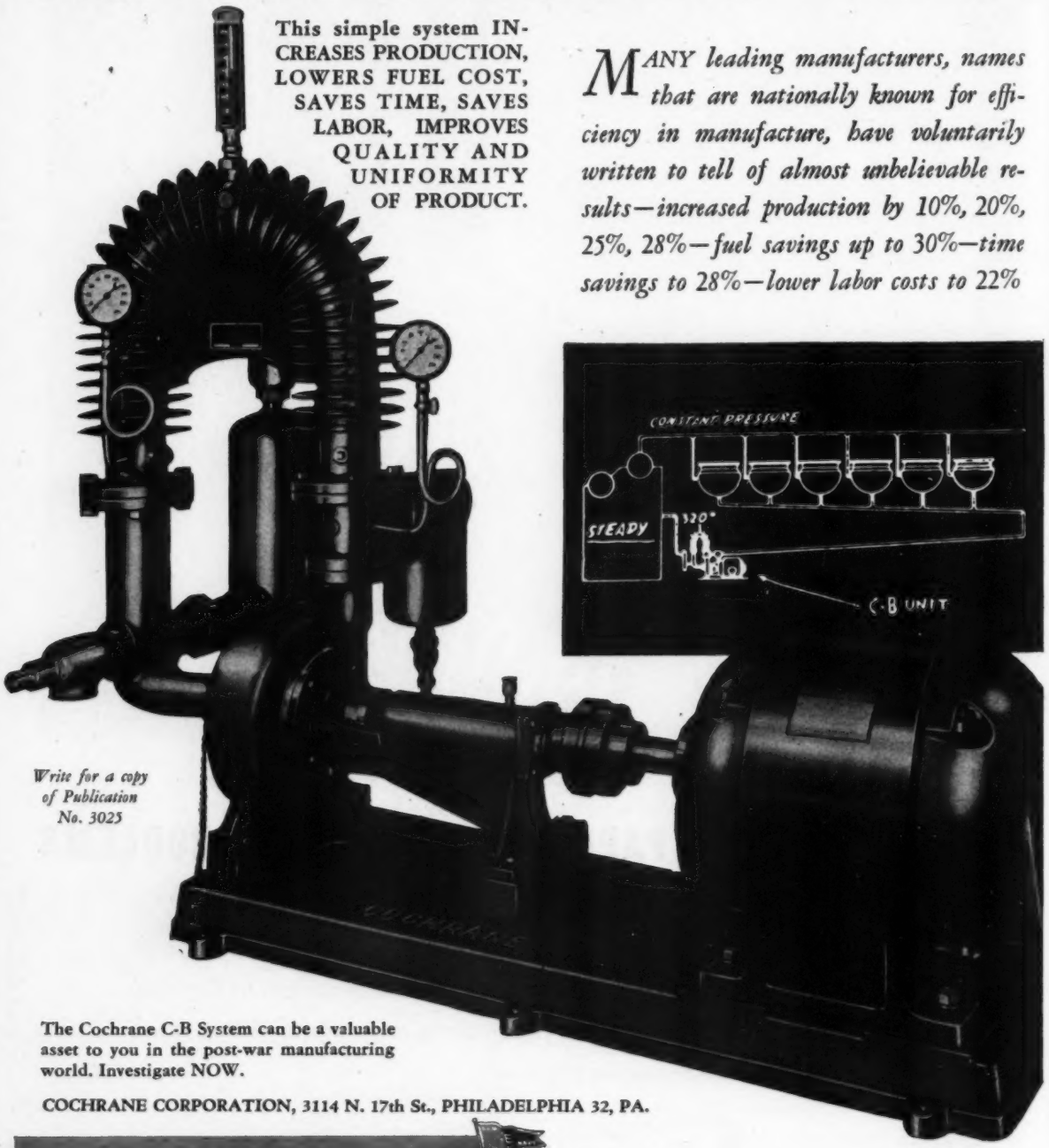
This is the Heart of the COCHRANE C-B SYSTEM of High Pressure, High Temperature Condensate Return

This simple system INCREASES PRODUCTION, LOWERS FUEL COST, SAVES TIME, SAVES LABOR, IMPROVES QUALITY AND UNIFORMITY OF PRODUCT.

MANY leading manufacturers, names that are nationally known for efficiency in manufacture, have voluntarily written to tell of almost unbelievable results—increased production by 10%, 20%, 25%, 28%—fuel savings up to 30%—time savings to 28%—lower labor costs to 22%



Write for a copy of Publication No. 3025

The Cochrane C-B System can be a valuable asset to you in the post-war manufacturing world. Investigate NOW.

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CONDENSATE RETURNED TO BOILERS AT HIGH PRESSURE AND HIGH TEMPERATURE

THE PAPER INDUSTRY
and PAPER WORLD

- Serving the Industry Since 1919 -

VOLUME 26 — JUNE, 1944 — NUMBER 3

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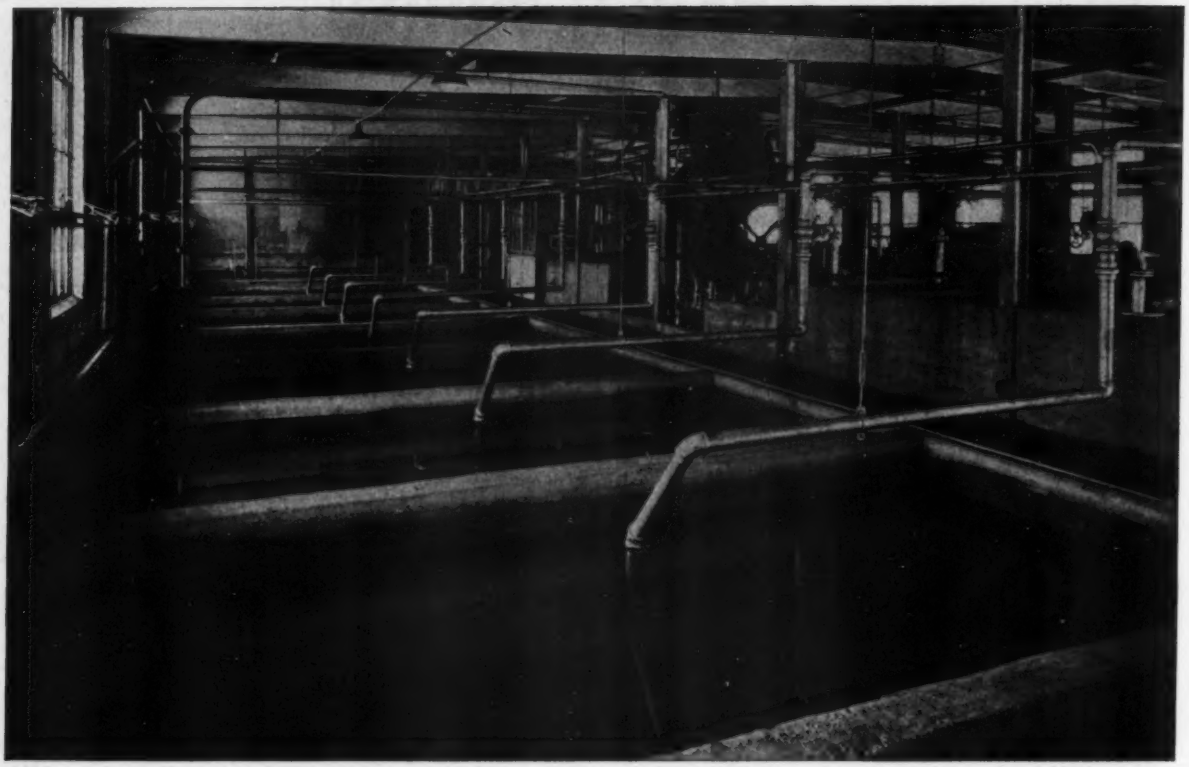
How to Get Better Process Water

We Can Build Norwood Advantages Into Your Present Filters ... Now ... To Give You Better Process Water



This typical filter installation has been completely rebuilt with Norwood equipment.

YOU can get better process water if you have the advantages of Norwood Filters . . . and we can build these modern advantages into your present filters now.

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We have helpful Engineering Data Units covering Norwood Equipment. Send for your set today.

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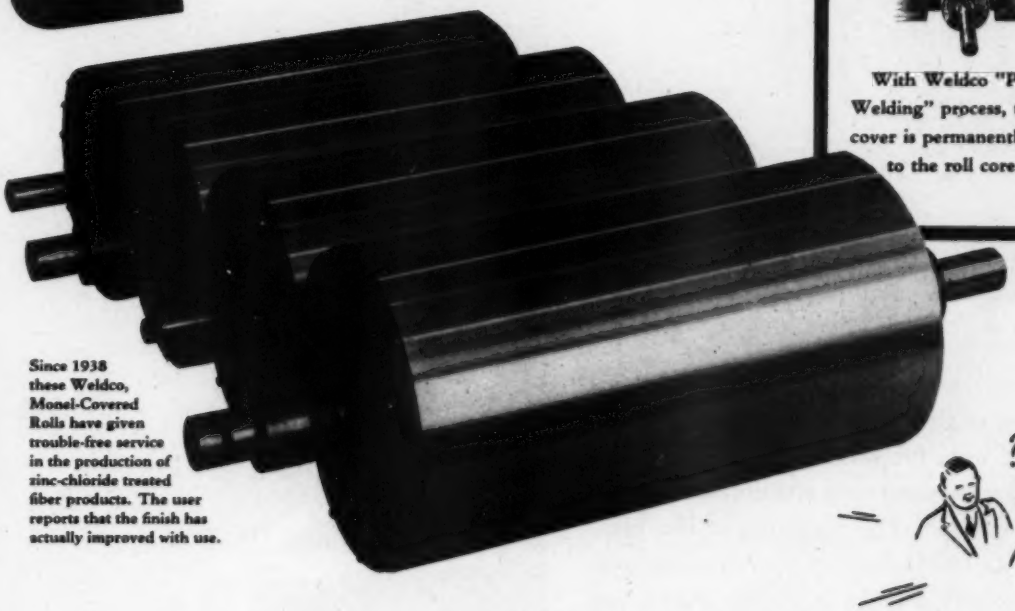
Shipments can't be made "as usual," but we will gladly discuss just what can be done to keep your filters running or bring them up to date. Write us about your process water problems today.

Get a Good Start And a Good Finish With
NORWOOD
WATER FILTERS AND PAPER FINISHING MACHINERY

The Norwood Engineering Company
16 No. Maple St., Florence, Mass.

Ask any paper mill machinery manufacturer this $64 question

With Weldco "Pressure Welding" process, the roll cover is permanently fixed to the roll core.



Since 1938 these Weldco, Monel-Covered Rolls have given trouble-free service in the production of zinc-chloride treated fiber products. The user reports that the finish has actually improved with use.

Are Weldco, Monel-Covered Rolls profitable to the mills that are now using them? . . . that is the question. Ask any paper mill machinery manufacturer, WHY . . . will they last as long or longer than other covers . . . do they do as good or a better job? Ask the manufacturer if he knows of as good or better combination of material and process to give covered rolls longer, more trouble-free life?

If you would like to have rolls reclaimed with Monel covers, or new Weldco, Monel-Covered Rolls, after you have asked these and other questions, any of the following machinery manufacturers will gladly quote you. All of them have furnished Weldco, Monel-Covered Rolls on their paper mill machines.

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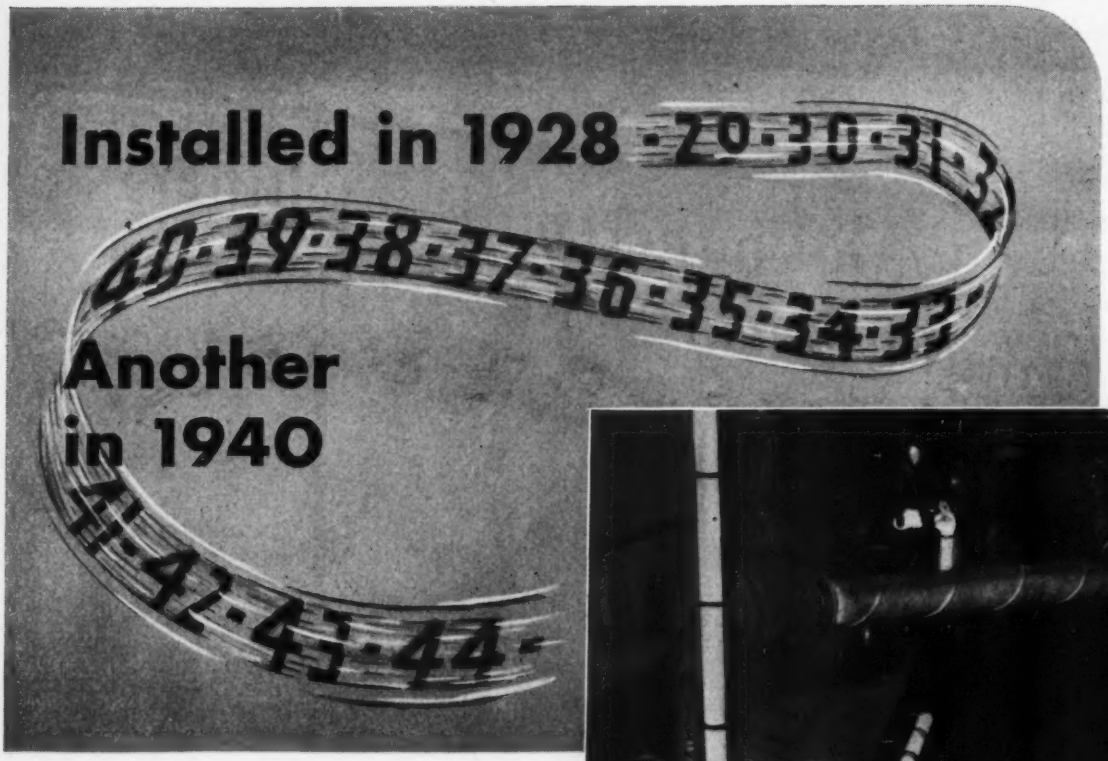
3752 OAKWOOD AVE., YOUNGSTOWN, OHIO

WELDCO



This condenser, installed in 1928, serves a steam engine and also heats circulating water used for washing pulp. A constant hot water temperature is maintained by suitable controls. The operation of this plant was so satisfactory, that a duplicate condenser was installed in 1940 in another one of the customer's mills.

Today—with a heavy war-time production job to do—both of these units are serving at top efficiency.

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Synthetic rubbers, so-called, are more accurately new types of rubber—types that can be more readily adapted to specific purposes, to give better service. They represent, in the rubber industry, the same technological progress that has been made in other industries as a result of the national urgency; so, also does the widely extended use of reclaimed rubber.

When the war is over there will be a new world for your products as well as ours.

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WORKS: CAMBRIDGE, MASS., U.S.A. P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

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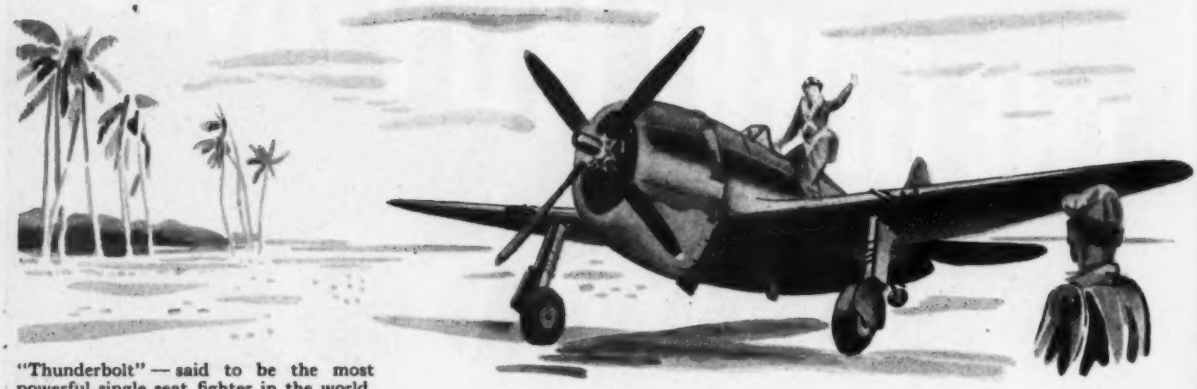
The Army's Answer to a "MUST!"



"Thunderbolt" — said to be the most powerful single seat fighter in the world, with four .50 caliber fixed machine guns mounted in each wing panel, a flying speed of 400 m. p. h. plus—and a diving speed greater than the speed of sound.

To be victorious in modern warfare, an army must not only have enough planes but they must be planes of many types. Each of these must satisfy all functional requirements peculiar to the service in which it will be used.

"Musts" are as constant in industrial as in military achievements. POWELL, for nearly one hundred years, has made valves, and *only* valves . . . valves for all flow control requirements . . . valves for the "must" requirements in all fields of industry. Our experience in producing *the* valve to do *the* specific job—"to meet the must"—is yours on request.

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Dependable Valves Since 1846

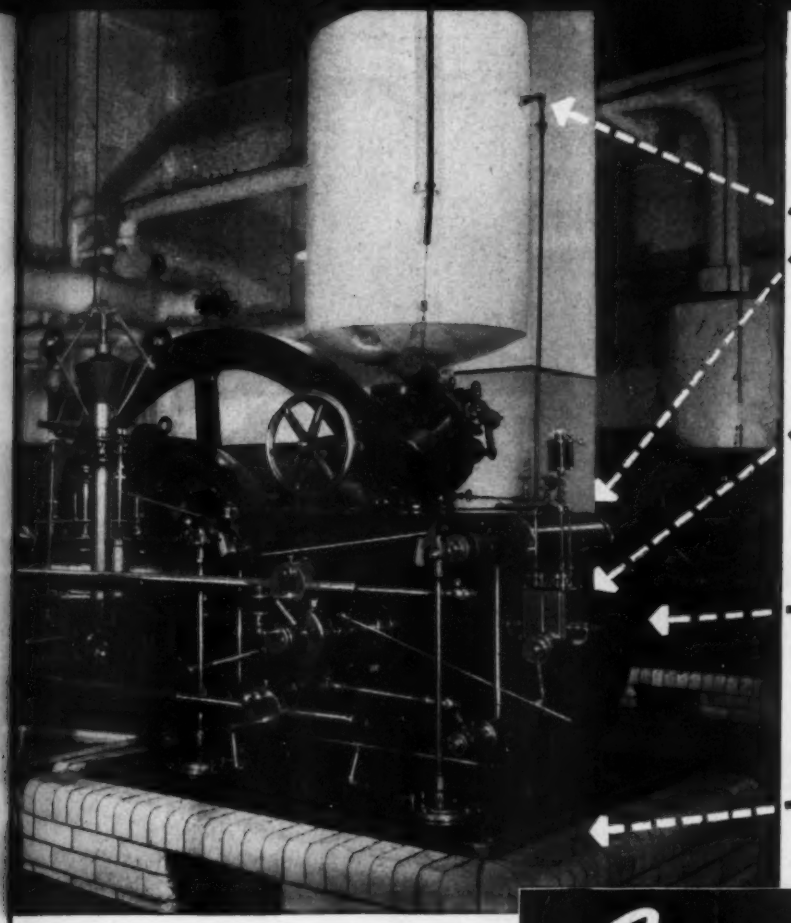
Cincinnati 22, Ohio

Fig. 1503—Class 150-pound Cast Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

Fig. 3031—Class 300-pound Cast Steel Globe Valve, with flanged ends, outside screw rising stem, bolted flanged yoke.

Fig. 6003—Class 600-pound Cast Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

POWELL VALVES



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2. LOWER OIL CONSUMPTION
3. BETTER LUBRICATION
4. CLEANER EXHAUST STEAM
5. ALL-PURPOSE CYLINDER OIL

5 operating advantages with New STANOCYL Steam Cylinder Oil

1. Less deposit formation. New Stanocyl protects engines against the formation of deposits. It contains a combination detergent and oxidation inhibitor in addition to special steam cylinder oil compounding. This inhibitor reduces oxidation of the oil at high temperatures—one frequent cause of deposit formation. The detergent additive helps keep deposits—either oxidized oil or foreign matter—from settling out at points of low steam velocity. Thus, the potential deposit-formers are carried through the engine and are easily removed from the exhaust steam.

2. Lower oil consumption. New Stanocyl atomizes readily even in the heaviest grades. This means that a heavier grade than would normally be used can be applied to take advantage of lower oil feeds, and still give adequate lubrication.

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4. Cleaner exhaust steam. New Stanocyl separates readily from exhaust steam. Where steam is used for processing or heating, proper separators adequately serviced will keep the steam free from oil carry-over.

5. An all-purpose cylinder oil. New Stanocyl is made in three grades. Two grades, W and SH, are available for special operating conditions. Stanocyl D is an all-purpose steam cylinder oil. This one oil will handle the cylinder lubrication requirements of a plant having a variety of engines. It will lubricate both high and low pressure cylinders of compound engines. Stanocyls have given excellent satisfaction at steam pressures ranging from 100 pounds saturated steam to 250 pounds with 100° F. superheat.

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Don't Waste a Drop!

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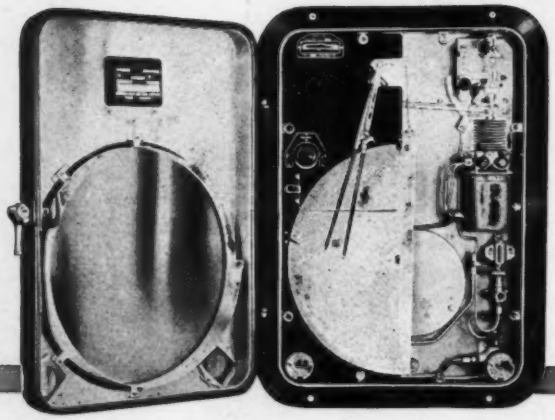
to Control 8 Variables with a Single, Simple System



BRISTOL CONVERTIBLE *Free-Vane* CONTROLLERS

for Temperature, Flow, Liquid Level, Pressure, Draft, Humidity, pH and Time Program

To cover the entire range of process-control functions from the simple opening and closing of a valve to complicated applications which call for wide throttling, time-lag allowance and prevention of over-shooting of the control point, Bristol offers these five types of air-operated controllers—all embodying the basic Free-Vane System.

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All Free-Vane CONTROLLERS ARE CONVERTIBLE

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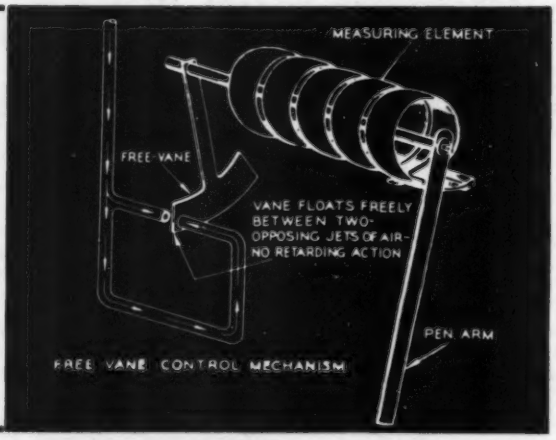
Write for Bulletin A-112 for complete details. Address 149 Bristol Road, Waterbury, Conn.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Engineers Process Control for Better Products and Profits

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Do you want to know more about this stainless-armored steel that is so sure to bulk large in the peacetime manufacturing of the future? Let us work with your engineers and design men to explore the possibilities of Pluramelt in your plans and products.

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An announcement of importance to the Packaging and Paper Industries

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Vinyl Resins & Plastics

Highly versatile synthetic materials offered to manufacturers and finishers

FROM GEON resins may be made a wide variety of thermoplastic elastomers that can be used as coatings for papers, calendered or cast into film and sheet, pressure or injection molded, punched or extruded—all at low cost on standard machinery. Or in other forms, GEON may be used as a sizing, ink or paint. The number of applications yet to be discovered seems limitless.

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Waterproof
Spongeable
Lightweight
Odorless
Increased tear resistance
Increased tensile strength
Easily embossed
Wide range of colors and luster
Can be heat-sealed

Resistant to

Acids
Alkalies
Chemicals
Oil
Foods
Creasing
Flame
Mildew
Spots and stains
Sticking
Light
Aging
Cold
Heat

This impressive list should suggest innumerable applications for GEON in the packaging and paper fields. Our research staff and laboratory facilities are available to help you work out any special problems or applications. Chemical Division, The B. F. Goodrich Co., Rose Building, Cleveland, Ohio.

★ ★ ★

For an informative folder which further describes GEON'S properties and suggests additional applications, or for answers to your questions, write Dept. M-1, Chemical Division, Rose Building, Cleveland 15, Ohio.

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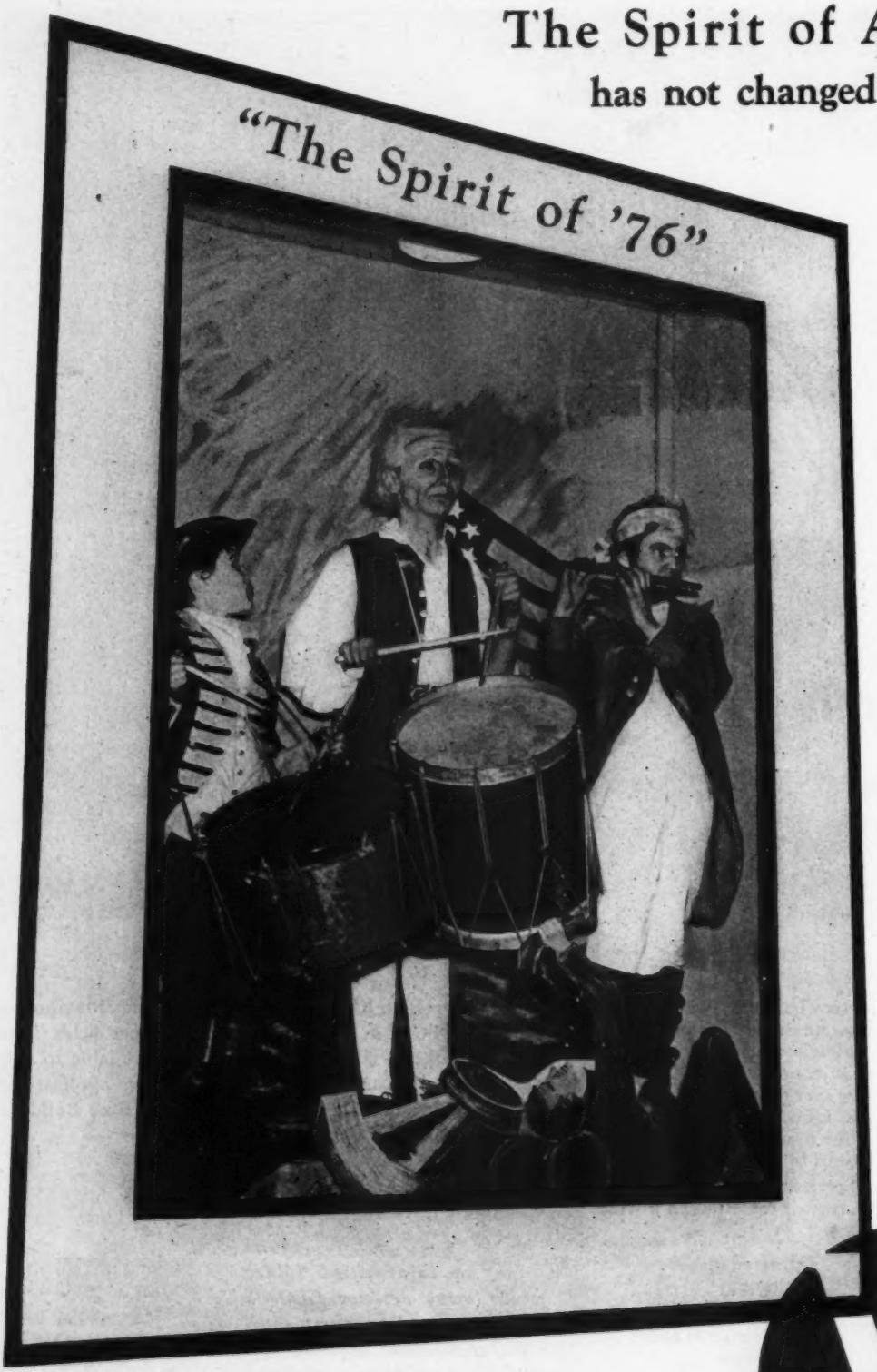
The Spirit of America

has not changed since



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Living models, authentically costumed, presented this tableau in a War Bond Drive in Chicago. (Courtesy Loop Photo Service.)

"Victory or defeat is not determined at the moment of crisis, but during the long, unspectacular period of preparation."

It will take more men and more money to defend our freedom. The 5th War Loan is on now. Our Government needs your help. A monetary loan to aid in carrying on the War is small when compared with the sacrifices made by our brave, gallant men—"That this nation under God shall have a new birth of freedom."

5TH WAR LOAN

TRADE WINDS

★ Washington News ★

WASTE PAPER SALVAGE IN ORDNANCE DEPOTS

Hundreds of different ways have been found at Ordnance Field Service Depots and Arsenals of the Ordnance Department, Army Service Forces, to save the taxpayers' money by developing new methods for salvage of materiel which in other days might have gone to waste. Of course, paper is saved and sold; but by the simple process of dumping all waste paper upon a conveyor belt and having it sorted by its different grades, Army Ordnance establishments are able to obtain a higher price from paper dealers than would otherwise be possible.

In one Ordnance Field Service Depot alone, the record of paper salvage in the first three months of 1944 totaled 754,780 pounds; with the month of March leading with 358,280 pounds. Totals in January were 208,880 and in February 187,620 pounds.

In this depot there are thousands of technical manuals printed for Ordnance troops all over the world, giving them instructions on how to repair Ordnance fighting equipment. These manuals are prepared to fit into the well-known binder for Army regulations and odd-shaped holes are punched into the printed manuals. Even the paper that is punched out is swept from the floors in the bindery, put into sacks and sold back to the paper mill to reduce the cost of operating Ordnance depots.

While the fiber containers in which shells for the 75-mm. gun are shipped overseas are not exactly paper, they can be salvaged and sent back to paper mills for crushing and the making of shipping boxes. Heretofore, these fiber containers contained the empty cartridge cases when they were shipped back from overseas after use. Ordnance Field Service found that the expense of separating the cartridge case from the fiber container was an expensive operation but it had to be done to salvage the brass cartridge cases returned from overseas.

It was found that if the fiber container and the empty cartridge could be returned separately, it would save sixty-five per cent in manpower and the fiber containers could be disposed of at a profit. The Ordnance Department arranged to have this done and the resultant economy has run into hundreds of thousands of man-hours saved and a tidy profit on the sale of the fibre containers. Wood also is a critical item and empty caliber .30 and .50 ammunition boxes are saved and remade into packing cases for the shipment of spare parts overseas.

APRIL RECEIPTS OF PULPWOOD 19.5% OVER APRIL, 1943

A late release from the War Production Board states that total United States receipts of pulpwood in April showed an improvement of 19.5 per cent over the same month a year ago, but 6.2 per cent below receipts in April 1942.

April mill receipts of domestic pulpwood, totaling 1,131,473 cords, were 22 per cent higher than in 1943 but, as in the first quarter, receipts failed to meet actual needs for domestic wood during the period, Mr. Madden pointed out. April receipts in 1943 were 926,665 cords.

Imports of pulpwood from Canada in April totaled 72,183 cords, compared with 80,871 cords in April 1943. This brought the month's total receipts at U. S. mills this year to 1,203,656 cords, Mr. Madden said, but he cautioned that, although receipts in April were higher than a year ago, it should be realized that receipts were abnormally low during that earlier period. He added that it must also be taken into consideration that because of depleted inventories, the mills in the Northeast are being forced to get in, as fast as possible, the wood cut in the rough wood season.

An analysis of receipts shows that: In the Northeast, where the pulpwood supply picture according to WPB is extremely critical, domestic receipts are 64,991 cords less than they were in March. The Lake states, which experienced a relatively high production of rough poplar earlier this year, show a drop of 192,889 cords below March receipts. The Appalachian region receipts were 18,366 cords over the previous month.

The record of April receipts of domestically cut pulpwood by regions follows:

Appalachian	139,144	rough cords
Northeast	95,205	" "
Lake States	148,163	" "
South	523,486	" "
Pacific Northwest	225,475	" "

Imports of pulpwood by U. S. mills were distributed as follows in April:

Appalachian	200	rough cords
Northeast	46,377	" "
Lake States	19,616	" "
Pacific Northwest	5,790	" "

PAPER MFRS. MAY GET LESS PULP FOR THIRD QUARTER

Prospects for third-quarter allocations of pulp indicate a further decrease in the amount allotted for paper manufacture. While no allocations have as yet been announced, it is known that the Army and Navy will need a much larger quantity of sulphite for ammunition for big guns than in previous quarters.

The war developments, such as the

experience of the Russians with heavy artillery, have caused a change in campaign methods, involving the use of much more heavy artillery and more large calibre guns than were used in earlier stages of the War.

The shortage of containers for essential materials, particularly food, for the Army, has caused the board industry to ask an increased allocation of pulp for the third quarter. The pulp to meet these needs must necessarily be reflected in reduced allocations for paper mills.

▶▶▶ THE EMPLOYMENT OF prisoners of war in the cutting of pulpwood is increasing rapidly, with considerable numbers of such workmen being given employment in various parts of the country. The Government itself, through the Texas Timber Salvage Project has 1,275 men at work in that area, with additional camps to be established, outside of the employment of 600 men in two private camps. Other allocations of such labor are being made in various parts of the country, and the relief from the pulpwood shortage will be material.

▶▶▶ CEILING PRICES for peeled poplar and peeled white birch pulpwood produced in Wisconsin, Michigan, and Minnesota, were increased 50 cents per cord on May 13. At the same time, ceiling increases were granted on spruce and balsam pulpwood produced in 50-inch lengths in one county of this region — Cook County, Minnesota. The increases are 80 to 90 cents a cord on rough balsam and spruce and $1.00 to $1.10 a cord on peeled balsam and spruce.

▶▶▶ A NEW DIRECTIVE, M-377 covering the allocation of wastepaper, was issued by the WPB on May 23. The purpose of this order is to set up machinery by which the WPB may direct the delivery of wastepaper at OPA ceiling prices to consumers who do not have enough for their essential needs. At present the order applies only to No. 1 Mixed Papers, No. 1 News, or Old Corrugated Containers.

▶▶▶ A BILL HAS BEEN introduced in Congress to restrict the operations of the Office of Price Administration to fixing price ceilings only where such ceilings will serve to prevent undue price advances. The bill would forbid the OPA to establish prices based on the profits of manufacturing companies and would require adjustment of ceilings to give effect to increases or decreases in costs of production, distribution and transportation. The bill is in line with a presentation by the American Paper and Pulp Association which objects to the injection of profit considerations in OPA price regulations.

▶▶▶ A COMMUNITY PROGRAM for planning postwar jobs and profits calling upon local advertisers and producers of advertising to join forces preparing now for peacetime has been compiled by the Graphic Arts Victory Committee in co-operation with the U. S. Department of Commerce. A brochure "You Have a Share in Your Town's Jobs and Profits," has been prepared, in which emphasis is placed on work to be done by local business organizations in strengthening their community position to meet postwar conditions.

▶▶▶ RECRUITS NUMBERING more than 60,000 for the army of workers in lumbering and pulpwood operations (which normally totals more than half a million men) must be found before next autumn if this year's requirements are to be met. This statement was made recently by Paul V. McNutt, chairman of the War Manpower Commission.

WPB AUTHORIZES CONSTRUCTION OF P & P M MACHINERY

Authorization to purchase materials for the construction of pulp and paper mill machinery costing approximately $2,500,000 have been approved by the Paper and Paperboard Division of WPB in the second quarter of 1944. This announcement was made May 21 by Allan Hyer, chief of the Distribution Section for Paper and Paperboard.

These authorizations probably will increase during the remainder of the quarterly period and will approach the total allotment of $2,898,000 set aside for the production of mill machinery, Mr. Hyer informed members of the Pulp and Paper Machinery Advisory Committee at a recent meeting. He explained that it is the aim of the Paper and Paperboard Divisions to expidite delivery of materials and equipment to mills producing essential paper and paperboard products. He said he believed WPB would be able to meet the demands of mills for necessary materials and machinery, but he explained that it was necessary to keep over-all supplies fairly liquid so as to be able to meet any emergency requests.

NEW DEVELOPMENTS AT MARATHON PAPER MILLS

Of importance to the food industry was the announcement by Marathon Paper Mills, Rothschild, Wisconsin, last month of new types of heat-sealable labels, coated, moisture-proof and heat-sealable papers, self-sealing laminated sheets used for packaging purposes, and a new thermoplastic, heat-sealable composition.

These new products are made possible by research carried on in the company's laboratories through which its research men have developed a series of alternative heat-sealing compositions and new products that require no critical war materials.

Before the War, the company used large quantities of rubber in producing its Parafilm products for packaging cheese and other foods. The efforts of the company in this new development have been a boon to the Wisconsin cheese industry.

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"MIRACLE OF PAPER"

A radio play entitled the "Miracle of Paper" recently was broadcast over station WHBY in Appleton, Wisconsin. The play, which carried the audience through the development of paper from the earliest Chinese product to the enormous variety of forms and uses in which it now occurs, was presented by the Combined Locks Grade School, Combined Locks, Wisconsin.

The subject had a particular personal interest to the youthful cast, many of whom have fathers and brothers participating in the reclamation of paper from telephone directories at the Combined Locks Paper Company.

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WEYERHAEUSER WILL MAKE INDUSTRIAL PLASTICS COMPOUNDS

For the past two years, the Development Department of the Weyerhaeuser Timber Company has been conducting experimental study on new products in the company's specially designed laboratory at Longview, Washington.

A western news report recently published in the *Forest Products News* states that company soon will begin small capacity production of molding powders for commercial markets to be used in molded plastic products.

This development work has been under the direction of C. C. Heritage, the company's technical director. The new laboratory was first occupied in November, 1942.

PAPER · · · America's 6th Industry

PAPER FOR CAMOUFLAGE

(NEWS ITEM: *Paper is now replacing cloth in nets made for military camouflage.*)

Paper impregnated with plastic is now being used to replace cloth in military camouflage. Strips two inches wide are woven on wire nets to make a covering that meets all official requirements for resistance to water, fire, mold and mildew.

Target paper for the practice range . . . condenser paper for electrical equipment . . . specially treated papers for insulation . . . newly-perfected paperboard cans for paint . . . New uses for paper, calling for new standards of lightness and toughness; new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

Puseyjones men and production facilities are at War—and Industry at War is Industry thinking and working at hitherto unheard of speeds. Our Research and Development Committee, working on the problems of America at War, is finding many practical and technical advantages that will be of incalculable value to America at peace—to the Paper Making Machinery of the future.

Puseyjones engineers will welcome the opportunity to work with you in your Post-War Planning. We have prepared three informative articles: "The Post-War Fourdrinier," "Development of Stream-Flow Vat System," "The Flow Spreader." Ask for reprints by name.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

CHAMPION PAPER AND FIBRE COMPANY MARKS ITS 50TH ANNIVERSARY

If the story of the growth of the Champion Paper and Fibre Company could have been foretold at the time of its inception fifty years ago, doubtless it would have been considered a fanciful tale of one man's dream of the future. But as told on the fiftieth anniversary of the company, that story is "coated" with reality and phenomenal development.

In the spring of 1894, Peter G. Thomson organized the Champion Coated Paper Company, and equipped a small plant in Hamilton, Ohio as a coating mill. It was planned to buy paper from various sources and put it through a coating process. The business was successful, and within two years it was necessary to almost double the capacity of the plant.

Around the turn of the century, however, the company went through a series of disasters: In 1898, it was damaged by severe floods; in 1901, the coating mill was practically wiped out by one of Hamilton's worst fires; in 1913, an unprecedented flood swept through the Miami Valley, and at the height of the flood Hamilton was visited by another spectacular fire.

But the company weathered these setbacks. In 1897, Mr. Thomson purchased the Eagle Mills in Franklin, Ohio, with two paper machines, to provide the company's paper requirements, and in 1900 he decided to build a paper mill at Hamilton to take care of expanding business.

The next move by the company was a pulp mill which was built at Canton, North Carolina, in 1905. In 1906, the company entered the business of making uncoated paper, and another new mill was built along the Miami River.

In 1934, the name of the company was changed to The Champion Paper and Fibre Company, as being more representative of the company's activities. The next expansion was in 1938 when a pulp and paper mill was built at Pasadena, near Houston, Texas.

Fifty years ago, the company started business with ten employees. Today's personnel roster has been multiplied 600 times. One of the ten employees who helped to load the first shipment of paper delivered by the company, is Charley Soule, who, half retired, is superintendent of the coating mill.

Two sons of the founder have succeeded to the presidency of the company. The first son, Alexander Thomson, started to work at the mill at the age of 17. He later became president, then chairman of the board until he passed away a few years ago. Logan G. Thomson, the present president, is another son of the founder. He, too, began his employment by working through the mill. The present officers are:

• President—Logan G. Thomson; executive vice president, Reuben B. Robertson, Sr.; vice president and general manager, Reuben B. Robertson, Jr. (now Major in the U. S. Army); vice president, Clarke Marion, now in Washington; vice president in charge of engineering and research at Hamilton, H. T. Randall; vice president in charge of advertising, Alexander Thomson, Jr.; vice president, John P. Osborne, New York, and M. Benzing, Hamilton; secretary-treasurer, Scott Zoller. Plant managers are: Homer H. Latimer at Hamilton; H. A. Helder at Canton; W. R. Crute at Houston, and Clyde Hutchinson at Sandersville, Georgia.

The company has more than 1,200 men and a number of women in the Armed Forces.

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DUTY TO BE HIGHER ON IMPORTED PAPERBOARD

Paperboard imported from Canada for use in packaging cereal foods, claimed to be dutiable at 20 per cent as test container board, classified by Customs officials as vat lined board at 30 per cent, was held to be dutiable at the higher rate because of its composition, even though it was to be used as the base for containers, according to a report issued by the Import Committee of the American Paper Industry.

A prolonged study on the usual composition of straw paper and straw board has resulted in a decision by Customs officials to admit a Canadian product containing 15 per cent groundwood as strawboard at 15 per cent. At first, the Customs officials believed that because of the presence of groundwood the material could not be considered strawboard, but investigation among American mills indicated that the use of a small proportion of groundwood was necessary in the production of any strawboard because of machine requirements, and that such use was customary. It is indicated, however, that too large a proportion of groundwood would throw paper and paperboard otherwise consisting of straw, into the higher rate classification of 30 per cent as paper not specially provided for.

A long pending test case at Los Angeles involving the dutiability of marbled kraft has been decided by the United States Customs Court which holds that the paper is not ordinary kraft wrapping paper dutiable at 20 per cent, but as wrapping paper with a fancy effect at 4½ cents per pound and 10 per cent, the paper being produced on a machine with attachments, that is, with two headboxes carrying different kinds or colors of pulp.

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PUGET SOUND AREA TO GET PULP LOGS FROM BRITISH COL.

Under a recent agreement between the Forest Products Bureau of the WPB and the Timber Comptroller of Canada's Department of Munitions and Supplies the Canadian Government will export approximately 32,500,000 board feet of hemlock and balsam pulp logs. This wood will be moved from the Canadian coastal area in British Columbia to the Puget Sound area of the United States.

Harold Boeschenstein, director of the Forest Products Bureau, referred to the allocation of pulp logs to three pulp manufacturing companies in the Puget Sound area. He stated that this allocation was based entirely on the highest essentiality of production for direct military uses. Mr. Boeschenstein added that in the event future war requirements for the various grades of wood pulp change the relative essentiality of the output of mills in this area, the Bureau proposes to take this into account and take such steps as are necessary to adjust distribution of supply so as to best serve changing war needs.

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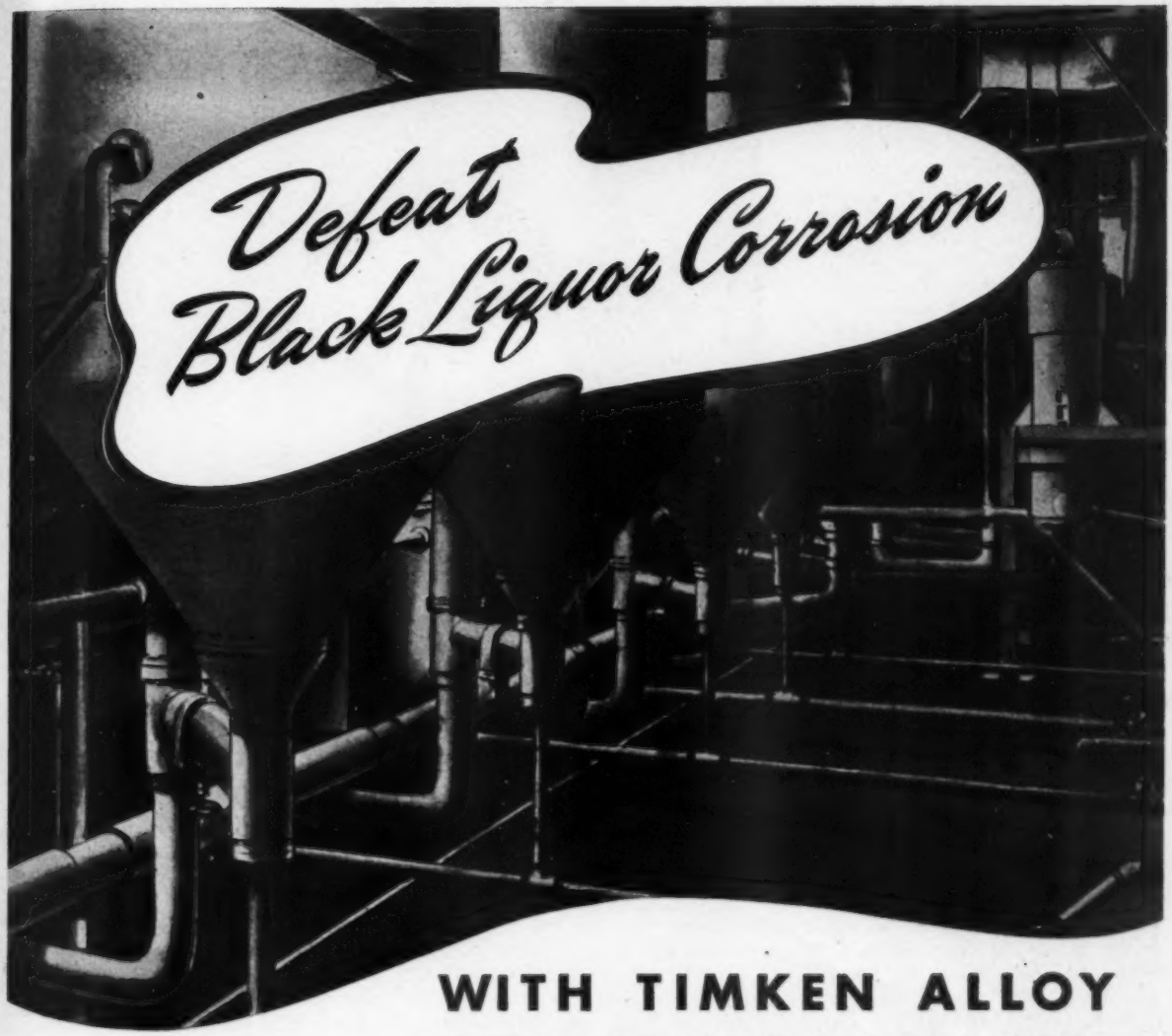
KNOWLTON BROS. MARK 120TH ANNIVERSARY

An honorary dinner marked the 120th anniversary of Knowlton Brothers, paper manufacturing company of Watertown, New York. The guests of honor at the dinner which was held Sunday evening, May 21, were twenty-three officers and employees of the company who have been associated with the organization for 25 years or longer.

The company was started in 1824 by George W. Knowlton, Sr., and Clark Rice, and it has been controlled continuously by the Knowlton family. G. Seymour Knowlton, chairman of the board of directors, has the longest service record—he has been associated with the company for 62 years. Second in seniority is James C. McCormick, treasurer, with a record of 54 years. The third in point of service is John H. Brownlee, a finisher in the mills; his record adds up to 44 years of service.

During the dinner, the twenty-



WITH TIMKEN ALLOY STEEL EVAPORATOR TUBES

CORROSION caused by black liquor is a serious problem. It is responsible for expensive replacements and down time, with a consequent loss of production and profits.

Many leading mill operators have found that the most economical way to defeat corrosion is to install Timken Alloy Steel Evaporator Tubes in their black liquor evaporators. Extensive tests, conducted over a period of years, prove that seamless tubes made of Timken Alloy Steels give uniformly better results.

Timken Seamless Tubes can be had in a wide range of analyses. No matter how exacting your individual requirements may be, you are sure to find a Timken Analysis ready to meet them.

Timken metallurgists have made a special study of the conditions of creep and corrosion at normal and elevated temperatures. As a result they are prepared to solve many of the knotty problems mill operators have to face.

A request on your firm's letterhead will bring you the Specifications of Timken Alloy Steel Tubes For Black Liquor Evaporators. Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
SEAMLESS STEEL TUBES

three guests were presented with service pins by Theodore Ely Knowlton, president of the company, who presided at the dinner. He is a brother of G. Seymour Knowlton.

The history of the beginning of Knowlton Brothers is a fascinating story which was related in a most interesting manner by the speakers at the anniversary event. The first paper made by the company was, of course, made by hand. Five persons were employed and the daily output was about 150 pounds of paper. During the early years of its operation, the company combined papermaking with printing—books, mostly school textbooks, were printed on paper produced in the mill.

The first name of the company was Knowlton & Rice, but in 1864 the Knowlton Brothers, for whom the present company is named—George W. Knowlton, Jr., and John C. Knowlton—bought out the business and ran it as a partnership until 1882, when it was incorporated.

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200 ATTEND ANNUAL CONFERENCE AT THE INSTITUTE OF P.C.

The annual conference of member mills of the Institute of Paper Chemistry, Appleton, Wisconsin, opened May 18 with about 200 executives in attendance.

President Ernest Mahler spoke at the banquet which was held the night of the 18th at the North Shore Golf Club. Speakers heard the opening day were: John Strange, secretary-treasurer of the Institute; Dr. Harry F. Lewis, dean; and Dr. J. E. Todd, assistant dean.

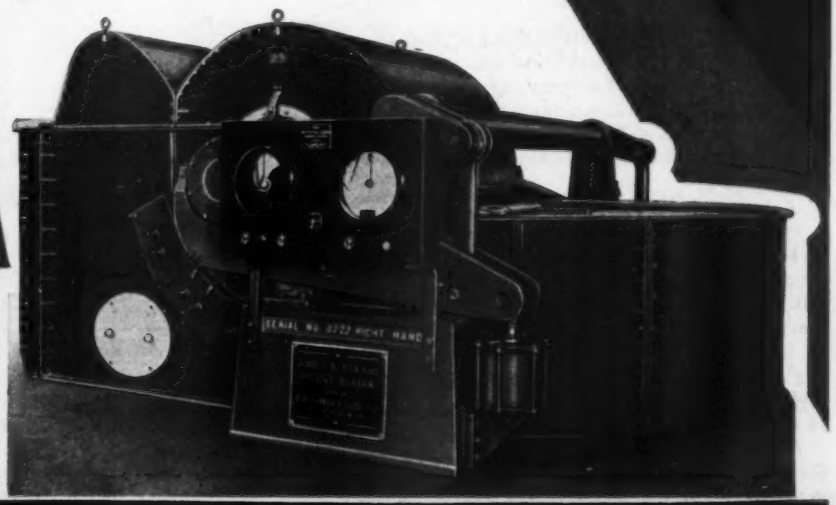
Among those attending were E. W. Tinker, executive secretary of the American Paper and Pulp Association; R. G. Macdonald, secretary of the Technical Association of the Pulp and Paper Industry; and Morris Dobrow, executive secretary Writing Paper Manufacturers Association.

Inspecting a Dilts beater at the Institute of Paper Chemistry are: (L to R) J. W. Close, of the United Wall Paper Company, Chicago; Charles Johnson, Institute of Paper Chemistry; and M. P. Reuben, assistant manager of the International Paper Company, Southern Kraft Div., York Haven, Pa.

LEFT—Mrs. Albert Koller, receptionist for the annual Executives Conference of the Institute of Paper Chemistry, registers George B. Hughey (left), head of experimental plant, West Virginia Pulp and Paper Company, Covington, Virginia; and F. G. Rawling, director of research, West Virginia Pulp and Paper Company, Luke, Maryland.

RIGHT—Arriving for the annual Executives Conference at the Institute of Paper Chemistry at Appleton, Wisconsin, are: (L to R) Maxwell D. Bardeen, president Lee Paper Company, Vicksburg, Michigan; M. C. Dobrow, executive secretary, Writing Paper Manufacturers Association, New York City; and A. C. Gilbert, president of Gilbert Paper Company, Menasha, Wisconsin.

THE TREND IS TOWARDS THE JONES-BERTRAMS BEATER



Jones

GEARED FOR WAR PRODUCTION

E.D. JONES & SONS COMPANY-PITTSFIELD, MASS.

Builders of Quality Machinery for Paper Mills

NEW PLASTICS PLANT TO BE BUILT BY HOWARD SMITH PAPER MILLS, LTD.

Construction at Cornwall, Ontario, in the near future of a plant for the manufacture of lignin plastics which will utilize waste pulp liquor was recently announced by A. E. H. Fair, manager of the Cornwall mill of Howard Smith Paper Mills, Limited. The plant will be constructed by the company and is to be located adjacent the present mill. While there are a number of details yet to be completed, Mr. Fair reveals that the plant will be in operation before the end of the year and will employ approximately 30 persons at the start.

The plastic material to be manufactured initially will be in the form of sheets. The material is described as similar to phenolic plastics, but is claimed to be stronger and superior in many ways. It has been emphasized that the new plant will be a pilot plant for experimental purposes, but if the new product develops as is expected, the plant may grow into a thriving industry. The pilot plant will be sufficiently large to permit manufacture of the plastics on a commercial scale and it is expected that the plant will be extended as new uses for the product increase the demand.

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▶▶▶ A SHORTAGE OF WOOD forced the plant of the Anglo-Canadian Pulp and Paper Company, Quebec, Canada, to close down for a time during the month of May. About 800 men were affected by the shutdown.

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FINANCIAL

▶▶▶ PAPER MILL SECURITIES almost universally followed the upward turn of the stock market during May. Practically every issue quoted on the New York Stock Exchange or the Curb Exchange was valued at higher figures at the end of May than at the same time in April.

Eastern Corporation—Net earnings for the March quarter were $110,670 as compared with $55,516 for the same quarter last year.

Great Northern Paper Company—Net earnings for the first quarter of 1944 were $488,426 as compared with $206,166 in the same quarter of 1943.

Hinde & Dauch Paper Company—Net profit for the March quarter was $301,820, as against $241,467 for the same quarter of 1943.

Hollingsworth & Whitney Company—Net profit for 1943 was $522,403, as against a net of $635,727 in 1942.

International Paper Company—Net profit for the March quarter was $2,116,706 as against $2,023,118 for the similar period of 1943.

Kimberly-Clark Corporation — Net profit in the March quarter was $708,-210.

Mead Corporation—Net profit for thirty-four weeks ending March 18 was $245,218, as against $251,173 for the comparable period a year ago.

Puget Sound Pulp & Timber Company—Net income for three months ending March 31 was $123,781, as against $104,759 in 1943.

Union Bag & Paper Corporation—Net profit for the March quarter was $423,236, as against a deficit of $188,-074 in the similar quarter of 1943, and a net income of $387,724 for the final quarter of 1943.

New York Stock Exchange—Stocks

	Closing Prices	
	May 25	April 25
A. P. W. Paper Co...	3	*2¼–2½
Celotex	11¾	11½
Same Preferred	17¾	*17⅜–17⅞
Certain-teed Products..	6	4⅝
Same Preferred	63½	57½
Champion P. & F. Co.	25½	*22–22¾
Same Preferred	*110½–112	108½
Container Corp.	24¼	22¼
Cont. Diamond	10¼	11
Crown Zellerbach	17⅛	16
Same Preferred	99½	91
Dixie Vortex	*16–16¼	16½
Same "A"	45½	44⅞
Robert Gair	3⅝	3½
Same Preferred	14¼	13¾
Gaylord Container	17½	*14–14½
Same Preferred	*54–55½	54
International Paper	16	13⅜
Same Preferred	80¼	71⅞
Kimberly Clark	*34½–36½	*35⅛–36
McAndrews & Forbes	*26–26¼	*25¾–26⅛
Masonite	49¾	43¼
Mead Corp.	9⅛	8½
Same Preferred	*89–92	*89½–90
National Container	15⅜	13⅛
Paraffine Cos.	51	*47⅛–48½
Same Preferred	105¼	105
Rayonier	14⅜	14
Same Preferred	30½	30
Scott Paper	*40⅛–41	*38½–39½
Same 4½% Pfd.	*110¼–111½	*109½–112
Same 4% Pfd.	*109½–110	*109–112
Sutherland Paper	*30½–31¼	*30½–31½
Union Bag & Paper	10⅞	9½
U. S. Gypsum	73½	71
Same Preferred	*173½–175	176

New York Stock Exchange—Bonds

Abitibi 5%	76¼	68½
Celotex 3¾%	.....	103½
Certain-teed 5½%	101	101¼
Champion P. & F. Co. 4½%	.....	.....
Inter. Paper 5%	103¾	104
Same 6%	107½	106½

New York Curb Exchange—Stocks

Am. Boxboard	.....	.....
Great Northern	33	33
Hummel Ross	5¼	5¼
St. Regis	4⅜	4½
Taggart	5⅜	5½
United Wall Paper	2¾	2½

*Closing Bid and Asked Prices

PACIFIC MILLS, LTD. LETS CONTRACT FOR NEW BLEACH PLANT

General contract for erection of a new bleach plant building to improve the quality and color of pulp and to be erected at Ocean Falls, British Columbia, for Pacific Mills, Limited, Vancouver, has been awarded to James L. Galloway. Designed by the company's engineers at Ocean Falls, plans reveal a four-story, reinforced concrete building 43 x 43 feet with flat tar and gravel roof. It will involve an expenditure of approximately $40,000 with a further sum being spent for installation of equipment.

According to J. A. Young, vice president of the company, the current contract is part and parcel of the big program of construction commenced some three years ago at the Ocean Falls plant. When the entire project has been completed by about September 30 of this year, a total expenditure of approximately $500,000 will have been made.

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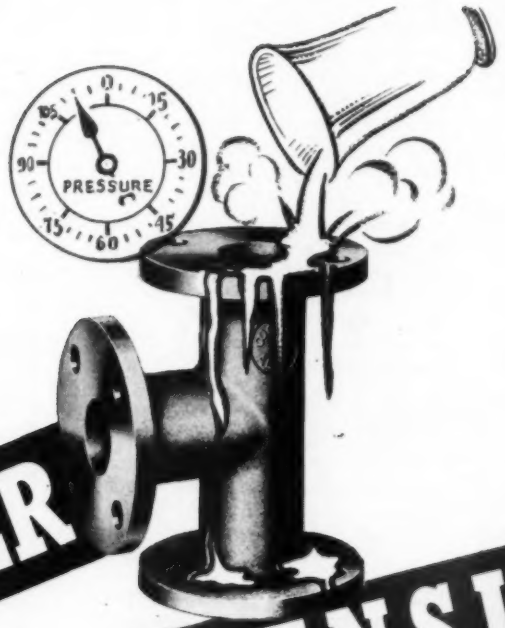
FELLOWSHIPS SET UP BY NAT. COUNCIL FOR STREAM IMPROVEMENT

The National Council for Stream Improvement (of the Pulp, Paper and Paperboard Industries) Inc., has announced the establishment as of May 24, 1944, of a multiple industrial fellowship in Mellon Institute, Pittsburgh, that will soon begin operation. The comprehensive research program of this fellowship, which will be conducted by specialists and for which the Institute will provide complete facilities, will pertain to the development of satisfactory methods for the disposal and utilization of wastes from the manufacture of pulp, paper, and paperboard. The personnel of the fellowship soon will be named.

For many years Mellon Institute has been active in evolving suitable waste-treatment processes for the coal, coke, iron and steel, chemical, and other industries. The institution has also been carrying on many investigations for public good that have included broad attention to problems in hygiene, including the abatement or control of urban smoke and dust and of stream pollution. The Industrial Hygiene Foundation has its headquarters in the Institute.

The investigational and developmental program of the National Council for Stream Improvement will draw from all this experience and will get the constant cooperation of the Institute's health, engineering, sanitary, cellulose, and paper experts. The aim



COOPER DENSICAST

STAINLESS CASTINGS

Stronger .... More Corrosion-resistant

Their superior grain refinement makes Cooper Densicast stainless castings stand up longer. They have higher physicals and greater resistance to corrosion—without altering the chemical composition of standard analyses such as types 312 (29-9), and 316 (18-8 SMO).

This is one of many Cooper specialties that have proved so successful in sulphite mill services. Specialties founded on long experience. We have made stainless castings for the paper industry since 1928. Some of them are still in service.

THE COOPER ALLOY FOUNDRY CO.
125 Bloy Street, Hillside, New Jersey

Cooper ALLOY FOUNDRY CO.

THE *Only* ALLOY FOUNDRY WITH *All* THESE FACILITIES

- Laboratory control over raw materials and finished products.
- Dual foundry . . . both hand and machine molding.
- Electric arc and high-frequency-induction melting furnaces.
- Centrifugally-cast castings.
- Heat treating of castings up to six feet in size.
- X-ray and Gamma-ray inspection.
- Machine shop . . . specially equipped for finishing stainless steel.
- Improved cleaning . . . including Lustracast electrolytic finishing which leaves all surfaces bright.
- Castings furnished rough, polished or fully machined . . . one ounce to two tons.
- Development of special alloys to meet unusual requirements.
- Technical consulting service.

will be to develop new economic procedures for eliminating stream contamination resulting from the discharge of wastes. Pollutive materials of the industries concerned will be investigated thoroughly with the objective of evolving novel and effectual methods for processing these wastes, to secure values from them, and to gain information of usefulness to individual companies in coping with their particular disposal problems. The fellowship staff will likewise co-ordinate the research efforts throughout its field.

The executive offices of the Council will be located at 271 Madison Avenue, New York 16, New York. The organization is supported by contributions from pulp, paper, and paperboard manufacturers, such contributors being assessed on a tonnage basis and representing the greatest part of the total pulp, paper and paperboard produced in the United States. It is planned to establish fellowships and other research programs at other institutions in various regions of the United States where urgent industry problems exist, all of these activities to be conducted under the general supervision of Mellon Institute and the Council's board of governors.

The officers of the Council are: Chairman, Board of Governors—George E. Dyke, president Robert Gair Company, Inc.; treasurer, J. D. Zink, president Strathmore Paper Company; executive secretary, Russell L. Winget, formerly with the American Paper and Pulp Association; and technical supervisor—Dr. Harry W. Gehm.

The board of governors is composed of eighteen officials of prominent pulp and paper mills.

◆

"AMERICAN MEN OF SCIENCE" INCLUDES 26 INSTITUTE STAFF

The Institute of Paper Chemistry is well represented in the latest edition of *American Men of Science,* which is a directory of American men and women who have achieved success in the fields of scientific and technological research. Twenty-six of the staff of the Institute are included. (This number includes three members of the faculty of Lawrence College who are also connected with the Institute).

The list, with the special field of activity of each staff member, is as follows: *John W. Appling,* microbiology; *Friedrich E. Brauns,* lignin chemistry; *Bertie L. Browning,* analytical chemistry; *Marion A. Buchanan,* organic chemistry; *James d'A. Clark,* paper chemistry (on leave with U. S. Army); *Paul F. Cundy,* analytical chemistry; *Stephen F. Darling,* organic chemistry; *William U. Gallaher,* water and trade waste treatment; *John W. Green,* organic chemistry; *Emil Heuser,* cellulose chemistry; *Irving H. Isenberg,* wood technology; *Otto Kress,* pulp and paper technology; *Harry F. Lewis,* organic chemistry; *Daniel R. Moltzau,* analytical and physical chemistry; *Philip Nolan,* physics, (on leave with U. S. Navy); *Irwin A. Pearl,* organic chemistry; *Anthony R. Ronzio,* organic chemistry; *Ben W. Rowland,* colloid chemistry; *Howard H. Rowley,* physical chemistry; *George R. Sears,* physics; *Olga A. Smith,* bacteriology; *Johannes A. Van den Akker,* physics; *Willis M. Van Horn,* trade waste disposal; *Sidney D. Wells,* pulp and paper technology; *Clarence J. West,* technical bibliography; and *Louis E. Wise,* wood chemistry.

◆

FILM SHOWS HOW TREE HARVESTING IS DONE AT FLORIDA P. & P. CO.

A feature enjoyed by a large gathering of delegates at the Superintendents Convention in Chicago was the showing of a movie "Trees and the Harvester." The film had been scheduled on the program of the Kraft group, but the interest spread so widely that it was given at a general showing on Thursday afternoon in the East Lounge.

The film was in technicolor and depicted the woods operations carried on at the Florida Pulp and Paper Company, Pensacola, Florida. J. H. Allen, president of that company, acted as narrator during the showing, and the presentation was highly entertaining and instructive.

◆

ONTARIO DROPS "BOMBS" ON SPRUCE BUDWORM

Ontario has begun the first attempt by civil authorities to use the weapons of war against a peacetime enemy. The Algonquin Park area of Northern Ontario has been "bombed" from the air with nicotine, arsenate and "DDT," a new chemical, in a determined attempt to reduce the ravages of the spruce budworm which in nine years has destroyed 15,000 square miles of balsam and white spruce.

The test is a co-operative undertaking between the U. S. Department of Agriculture and the federal and provincial departments in Canada. The results of the spraying will be carefully studied to determine the effectiveness of the air method of combating the forest pest.

BROMPTON TO HAVE SULPHATE PULP MILL AT RED ROCK PLANT

The Brompton Pulp and Paper Company, which bought the property and partly completed buildings of the late Lake Sulphite Pulp Company at Red Rock, Ontario, has begun work on the development there of a modern sulphate pulp mill. H. Grinstad, who has been superintendent of the company's sulphate mill at East Angus, Quebec, is in charge of the new development. It is understood that the major items of equipment are already ordered and that reasonably early delivery is expected. An interesting point is that this new mill ties in with the first sulphate mill on this continent, the East Angus plant having been established in 1907.

◆

▶▶▶ THE WARTIME PRICES and Trade Board of Canada has announced restrictions ranging from 5 to 40 per cent in the quantity of paperboard which may be used in making certain articles, packages and converted paper products, and the elimination of more than 40 other items. The quota for containers supplied retailers for packaging goods at retail—other than those designed to package perishable goods—has been fixed at 65 per cent of 1943 purchases.

◆

YOUNGSTERS PLANT 30,000 SEEDLINGS IN SIXTY MINUTES

Thirty thousand Norway pine seedlings planted on 30 acres of cut-over land by 400 high school students in one hour flat was the highlight of the first Reforestation Institute held in Wisconsin, on May 12 and 13. It was sponsored by Trees for Tomorrow, Inc., newly organized by the pulp and paper industry of the Wisconsin River valley to promote reforestation in that state.

The institute was held in Rhinelander, center of one of Wisconsin's great pulp and paper areas. For two days, paper mill men, U. S. and state foresters, educators, conservationists, and citizens generally heard discussions of reforestation and forest problems. At the opening session, Folke Becker, head of the Rhinelander Paper Co., and president of Trees for Tomorrow, Inc., announced that $2,500 in scholarship awards would be given next year to High School students in the Wisconsin valley interested in entering Forestry Schools.

Organization of Trees for Tomor-

row, Inc., is a result of last year's victory pulpwood cutting drive, in which the *Merrill* (Wis.) *Herald* won a national prize offered by the American Publishers' Association. Arguing that if organization could prove that effective in cutting trees, it could prove equally effective in growing them, M. N. Taylor, advertising manager of the *Herald,* promoted the idea of a permanent organization among pulp and paper mills of the area.

Dedication of the Rhinelander High School's 360-acre school forest brought to 16 the number of such forests in Oneida County. There are 212 in Wisconsin as a whole, embracing some 14,000 acres.

The Institute featured 1,000 square feet of exhibits of forestry methods and forest products including impregnated laminated paper developments. Member mills, with others expected to join, now include the Consolidated Water Power and Paper Company, Wisconsin Rapids; Whiting-Plover Paper Company, Stevens Point; Mosinee Paper Mills Company, Mosinee; Marathon Paper Mills, Rothschild; Wausau Paper Mills, Brokaw; Ward Paper Company, Merrill; Tomahawk Kraft Paper Company and the Tomahawk Pulp Company, Tomahawk; and the Rhinelander Paper Company, Rhinelander. A number of these companies are operating their own industrial forests, in an effort to restore the productive capacity of Northern Wisconsin's forest lands.

◆

CONVENTIONS AND COMING EVENTS

September 14-16—Fall meeting of the Northeastern Division of the American Pulp and Paper Mill Superintendents Association at Poland Spring House, Poland Springs, Maine.

October 3-5—33rd National Safety Congress and Exposition at the Sherman, Morrison and La Salle Hotels, Chicago.

November 15-19—National Chemical Exposition at the Coliseum, Chicago.

STATED MEETINGS

Technical Associations of the Pulp and Paper Industry

Delaware Valley Section—First Friday of each month at the Engineers' Club, Philadelphia, Pa.

Kalamazoo Valley Section—First Thursday of each month, including June, at 6:30 P. M. at the Columbia Hotel, Kalamazoo, Mich.

Lake States Section—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

New England Section—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Chicago Professional Paper Group

First Monday of each month except July and August, at Chicago.

American Pioneers

First bicycle — the "Boneshaker," was popular in 1865 to 1869, followed by the high wheeler in 1872 to 1885.

The racing type of "front wheeler" bicycles attained a speed comparable with the fastest paper machines, or around 1500 feet per minute. This depended of course, on the stamina and strength of the rider.

The speed of a paper machine on the other hand, depends upon other factors, yet is largely determined by the porosity of the felts provided.

DRAPER FELTS are designed to give the maximum porosity consistent with your other specifications. Perhaps we can re-design your felts so as to attain greater speed and more production.

Why not try a DRAPER FELT?

Draper Felts For Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASS.

OUR REPRESENTATIVES *to serve you*

L. H. BREYFOGLE, Kalamazoo, Mich.
W. L. CAMPBELL, Savannah, Ga.
CHAS. E. BERTSCHY, Milwaukee, Wis.
RALPH E. BRIGGS, Canton, Mass.
E. R. LELOFF, Vancouver, Wash.

Use it up . . .

That's the thing to do in wartime. Eat every bite of food, save every scrap of soap, make a patriotic habit of stretching all the supplies in the house so they go further, last longer.

Wear it out . . .

This year old coats, old shoes, are a badge of honor. They show you're sensible enough to know that one way to help win the war, to keep prices down, is to wear your old things out!

Make it do . . .

Before you spend a penny in wartime, ask yourself, "Do I really need this? Or do I have something now that will do?" As you patch and darn and turn, you're keeping prices down.

or do without!

When you put your money in War Bonds, savings, taxes, insurance—you're putting your money to work fighting the war and building a sound, stable nation for the peace to come.

It's your money you're saving when you help keep prices down. For it's buying too much when there's too little to buy that sends prices up. And when prices go up—and keep going up—your savings, your future, are in danger.

How can you help keep prices down?

By never spending a thin dime you could turn into a War Stamp. By thinking twice—and thinking "No"—at every urge to open your purse.

By wearing old things out, making makeshifts do. Remember, it's the things you *don't* buy that keep prices down!

See that prices go no higher . . . Be a saver—not a Buyer!

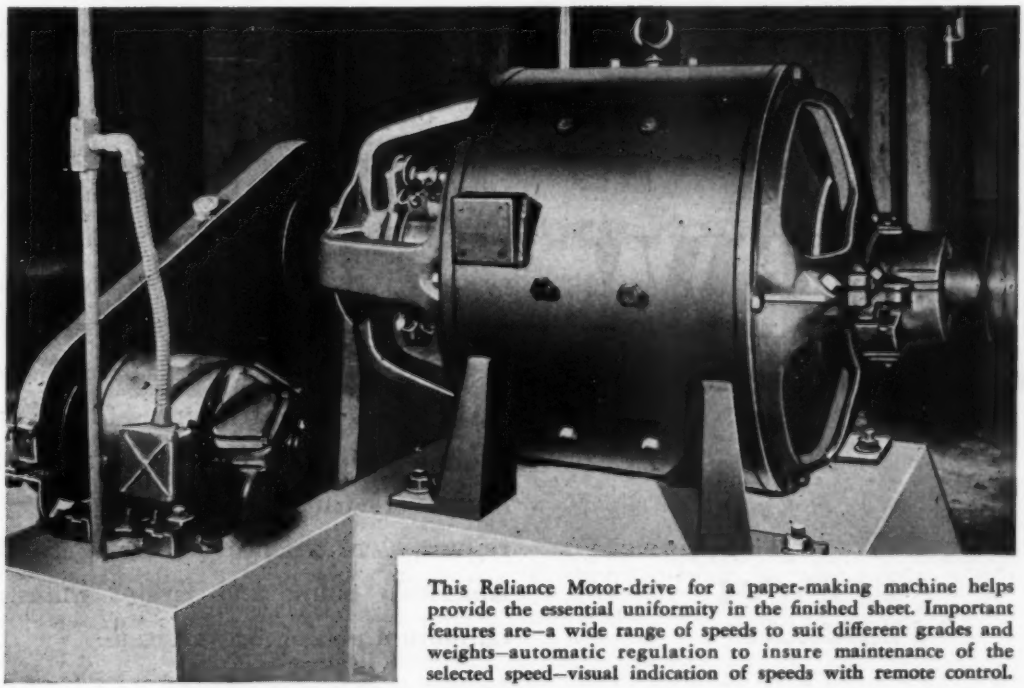
HELP US KEEP PRICES DOWN

A United States war message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

UNIFORMITY

Where uniformity of the finished product is an essential consideration, as in the production of paper, textiles, metals, chemicals and various other materials, the proper type of Reliance Motor-drive can bring about notably improved results.

When designing machinery for handling such materials, or when starting to work out improvements in existing equipment, you will find that Reliance Motor-drive can be used for many purposes besides providing power. Without mechanical "go-betweens," it performs many operations and gives a control over production that can be obtained only with difficulty, and seldom as satisfactorily, by other and more complicated methods. It should pay you to investigate.



This Reliance Motor-drive for a paper-making machine helps provide the essential uniformity in the finished sheet. Important features are—a wide range of speeds to suit different grades and weights—automatic regulation to insure maintenance of the selected speed—visual indication of speeds with remote control.

RELIANCE A·C D·C MOTORS

RELIANCE ELECTRIC & ENGINEERING CO.

1088 IVANHOE ROAD • CLEVELAND 10, OHIO

Birmingham • Boston • Buffalo • Chicago • Cincinnati • Detroit • Greenville (S.C.) • Houston • Los Angeles • Minneapolis • New York Philadelphia • Pittsburgh • Portland (Ore.) • St. Louis • Salt Lake City • San Francisco • Syracuse • Washington, D.C. • other principal cities

CRODON PLATING pays

IF YOU CAN'T REPLACE • • • RENEW!

FULL-TIME emergency operations shorten the normal useful life of machinery and equipment. Necessary replacements are frequently unavailable, but essential production MUST continue without interruption.

Industrial CRODON-plating provides new-equipment performance. It avoids the use of scarce metals for *entire* machines or parts. It shortens replacement time and reduces production losses due to worn-out equipment. There is substantial economy in restoring worn parts by industrial chrome plating, as well as a material saving in the consumption of strategic metals. CRODON is useful in rebuilding parts that are undersized due to errors in machining.

CRODON plate re-surfaces worn parts with an extremely hard, smooth, long-wearing, corrosion-resistant protective coating. It may be finished to exact tolerances. It is available to essential industries as a proven method of repair and maintenance—more than ever useful on new equipment for dependable operation. Behind every CRODON application are the resources, experience and reputation of America's oldest and largest industrial chromium plating organization.

CRODON
The Chrome Plate
TRADE MARK REG. U. S. PAT. OFF.

CHROMIUM CORPORATION OF AMERICA

EXECUTIVE OFFICES—120 BROADWAY, NEW YORK

346 Huntingdon Avenue
Waterbury, Conn.

1760 Lakeview Road
Cleveland, Ohio

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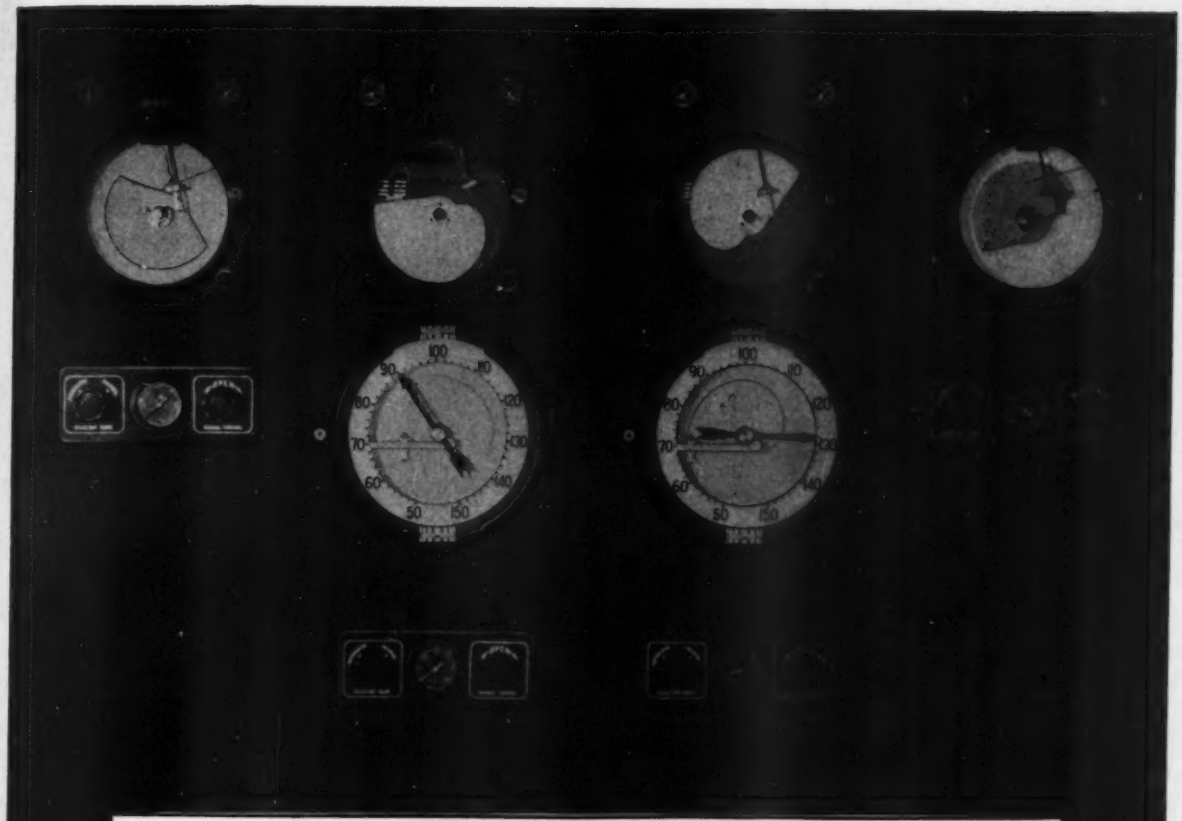
Chicago, Ill.



MASONEILAN CONTROLS
Help to Produce Paper
Faster . . . Better . . . More Economically

Today, when time is precious and paper scarce, Masoneilan control equipment is helping paper makers get out paper fast.

Simple, accurate, sensitive, these controls give operators complete control over every process thereby enabling them to produce better quality paper with little if any rejects. And because all Masoneilan controls, such as regulators, indicators, recorders, complete digestor controls, etc., are constructed to give dependable service year after year, they increase production by reducing time out for maintenance.

It will pay you to investigate Masoneilan Control Equipment for your plant . . . *when war is won.*

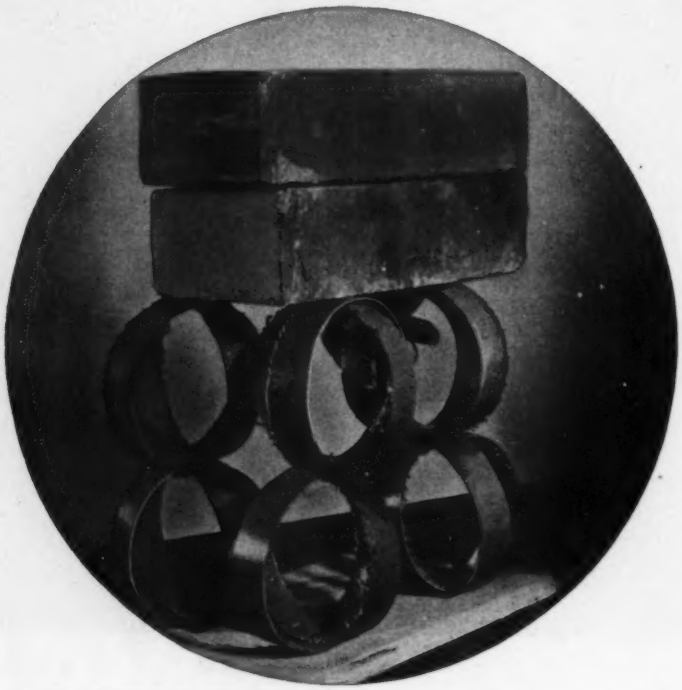
MASON-NEILAN REGULATOR COMPANY
1196 ADAMS STREET, BOSTON 24, MASS.

MASONEILAN

New York • Philadelphia • Pittsburgh • Toledo
Chicago • Tulsa • Atlanta • St. Louis • Houston
Los Angeles • San Francisco
Mason Regulator Co. of Canada, Ltd., Montreal, Canada

For Victory — Keep Buying Bonds

BEDTIME STORY



PAPER products make the front page regularly these days, as they play their wartime roles . . . one of the most interesting of which is *paper bed springs.*

Conditions as they are today throughout the pulp and paper industries call for highly efficient mill operation, and mill owners everywhere are realizing more and more that effective Texaco lubrication is a great aid.

In drier and calender bearings, for example, *Texaco Ursa Oils* assure effective lubrication under all operating conditions.

Texaco lubricants have proved so effective in service that they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ *More revenue airline miles in the U. S. are flown with Texaco than with any other brand.*

★ *More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.*

★ *More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.*

★ *More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.*

★ *More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.*

TEXACO

TEXACO Lubricants

FOR THE PAPER INDUSTRY

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

. . . Editorial . . . . . .

The Event

▸▸▸ THE WHOLE WORLD STANDS today with bated breath, poised on the verge of the most momentous event in its entire history.

Upon the outcome of that event depends the destiny of the world for generations to come.

The world is divided into two armed camps: The Allies, for freedom; The Axis, for brutal, despotic slavery.

The fight is Christendom versus heathendom—the forces of Christendom will win.

Look at them as they stand ready to take the plunge at the zero hour:

The Allies, alert, calm, completely equipped with surplus armament and supplies on every global front. They dominate the seas. They have overwhelming possession of the air, everywhere. Every soldier, from their commanding General down to and including every buck private is imbued with the knowledge of the righteousness of his prospective sacrifice. Hear them crooning on this eve of the crash:

"Then conquer we must
For our cause, it is just
And this be our motto
In God is our trust."

Men bred to such brave birthrights are unbeatable.

And, now, behold the Axis! Desperate, despairing and baffled on every front; swept from the skies; driven from the seas. Shattered, shellacked and plastered by concentrated, devastating, continuous bombing the clock-around, night and day, the lethal rains fall from the heavens. Punishment which no humans may survive. Their losses are irretrievable. Their doom is unplacable. Their resistance is but numbed desperation. They asked for it. They first took up the sword of ruthless, pitiless demolition.

The conditions they themselves evolved have engulfed them. The pits of destruction which they digged for others are now yawning wide for their reception. Their peoples are pitiful, political dupes. Their leaders are international outlaws. They have no escape from the obliterating carnage save one—unconditional surrender!

The bell for the decisive *coup de grace* is about to ring. Before these lines are printed, the final tidal wave of conquering Allies may be moving relentlessly toward Berlin.

So what? Lift up your eyes unto the hills from which cometh your help. Gird up your loins with confidence and thank God daily that by an accident of birth, you were born an Ally and not an Axis. Let your gratitude be manifested by deeds of daring for righteousness, for the day of liberation of the world from tyranny is nigh.

"As the Twig Is Bent"

▸▸▸ IN A TALK delivered before the Business and Professional Men's Group of the University of Cincinnati on March 10, 1944, Edward L. Bernays, Counsel on Public Relations, in part, highlighted a number of social facts which American business must take into consideration and accept if the kind of a world we want for ourselves and our children is to be achieved. Among these facts were the following:

"The businessman must keep abreast of the present and even anticipate the future in his thinking and his acting.

"Government action is necessary to correct disparities among groups—including, among others, action on tariffs, subsidies, currency, balances between production and consumption, social security, transportation.

"Some of the authority the businessmen needed to survive when this was a pioneer country must be given up.

"The world and the United States are interdependent. The businessman must understand the world, the United States and the place of business in relationship to them.

"The people as a whole won't stand for profits made at the expense of workers,—migratory workers, or depressed farm populations as in some parts of the South, or others.

"The American people will insist that economic power shall not be used to influence political power, except as it does for the broad social interest.

"Millions of servicemen, who now are sacrificing their lives for our country, will continue to a heightened degree to be aware of the obligations their country has to these democratic goals when they return to civilian life. They will expect their pursuit of happiness from private industry or their government. And this pursuit of happiness will be more than jobs at prewar pay. Acceptance of this reality by business will give our system greater security. It will help preserve our system of predominantly free enterprise, even though it may be for less profit. *In the short swings of the pendulum that may occur, some businessmen may stand out for reaction. That would be a deadly mistake.* It might lead to some form of totalitarianism. To maintain our basic patterns of life, economic and governmental, we must guard against extremes of right or the left; must stick to the center. The question we are facing is not shall we or shall we not continue as we have, but how shall we best preserve the values of democracy and free enterprise."

Mr. Bernays, in these few epitomized statements, has blueprinted some of the outstanding concepts of tomorrow's public relations. They are deserving of the most careful scrutiny and analysis on the part of every reader. It is well to remember that "just as the twig is bent, the tree's inclined."

Current Thought

WILLIAM SIBLEY

Will the Future Bring More Than Gadgets?

▸▸▸ WE ARE CURRENTLY being treated to a flock of fantastic predictions and promises about the developments of the future. Magazines of every type and fashion are filled with dream fantasies conjured up by the 1944 Jules Verne. All the way from the *Satevepost* to the *Cheese-Hole Workers Journal,* magazines give us visions of things which seemingly will be ours, immediately following Victory. All of which is very healthy and entertaining, but much of which is duff and stuff. The "brave new world" which is to be, apparently will be unrecognizable to adherents of the present generation. We will be living in all-glass (or Gypsy Rose Lee) houses with movable partitions and invisible paint. That is—if we are to believe all that is presented to us by imaginative artists. Our automobiles will have all-plastic tops (a hell of an innovation for the Arizona sun) and our power shovels will have telescopic booms. That is—if we give credence to the guys who are currently abetting the paper shortage.

But I would like to go on record here as saying that better gadgets in themselves do not and cannot make for better living. We shall have a better world only to the extent that our social thinking and social progress keep pace with the physical sciences. In my opinion, therein lies the basic challenge of the postwar years. It is a challenge to brains and initiative, and the co-operation of Government and industry, labor and management, mind and matter, religion and education. "Gadgets" we will have in plethora—we have come too far in chemistry, electronics and mathematics to do otherwise. Many of the new things to be developed will be highly interesting and of incomprehensible value. But wherein they will improve our thinking, make more profitable our leisure, or better our lives, is a challenge which must be answered, in a world at peace, by the minds and hearts of men of good will.

Giving way to the indulgence of prophecy, here are just a few of the things which are now being planned for the days A. P. (After Priorities). Most of these developments are already in the field being proved as to their efficiency. Their production awaits only the release of materials and manpower. Most of our doors of tomorrow will be motivated by the electric eye. Window glass will be nonbreakable and sans the sunray stopping lead. Our dishes will be of colorful plastic, immune to breakage, cracking, discoloration or absorption. Many of our dishes will be disposable.

We shall have universal electric heating of the soil to force the growth of special or hothouse crops. Electric lights of the sort which will speed the growth of indoor-grown vegetables. Vastly improved long-range weather forecasting to benefit the farmer, packer and shipper of food. We shall have greater development of dehydrated foods, with radio heat used in the final stages of the dehydration processes; standard cuts of meat boned and packaged at the packing plant; ready-to-serve coffee in containers; edible fats derived from coal or petroleum.

Our automobiles and railroad trains will be crash or collision proof, rustproof and silent. Polaroid headlights and windshield to prevent glare. Plastic upholstery which may be cleaned with soap and water. Road surfaces which neither produce glare nor become exceedingly vulernable bomb targets. Fifty gallons to the mile through the use of high octane gasoline—far more powerful than our present 100-octane gas.

The airplanes of tomorrow will have motors and propellers so designed as to practically eliminate both noise and vibration. Airplanes which will travel faster than sound will become commonplace. Transcontinental glider trains for both passenger and freight service. Also transoceanic glider trains. We shall have high altitude airplanes propelled by rockets. We also shall have airplanes powered by radio; dispatched by one station and caught by another. Great expansion of airfields and roof-landing areas for helicopters. Free flying instructions in public schools and colleges.

We shall witness the development of vastly improved, noiseless and vibrationless railroad trains. The jiggling, coffee-spilling, dining car of the present day which invariably reminds one of a convention of Swiss bell ringers will become museum pieces. Rubber tie-plates and welded rails to eliminate joints will become a fact. Individual radio and television receivers at every passenger seat, not audible or visible to other passengers.

Our ships will be controlled by radio-electronic devices to prevent collisions with land, icebergs, or other ships. Plastic bearings for propeller shafts, water lubricated. First class passage rates to distant ports far lower than the rates which prevailed before the War. Inexpensive pleasure craft made from lightweight plywood. Weather maps, daily or hourly newspapers, orders, bulletins and business letters on shipboard by radio facsimile. International radio telegraph communication at high speeds, (more than 650 words a minute on a single channel). Much wider use of electrically distributed music and radio broadcast in industrial plants to aid production and industrial relations.

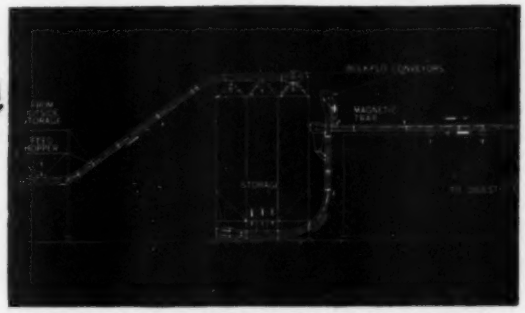
We shall see unattended, automatic radio relay stations from 20 to 50 miles apart (much like our present day electrical "step up" generators) relaying television and other forms of radio communication from city to city, making possible national networks. Coaxial cables transmitting all forms of radio communications or broadcasting—telephony, telegraphy, television, facsimile—from city to city. Radio programs broadcast with two-dimensional or stereophonic sound, transmitted through two microphones, and received through two separate loud speakers; also similar acoustic perspective in phonograph reproducing systems. Electronic devices for detection of smoke or gas; matching colors; counting objects; determining flaws in metal; controlling temperature and humidity; measuring speed of passing objects from a racehorse to a bullet; locating underground ore or oil; locating schools of fish, etc., etc.

Yes—it is to be a "brave new world." And an interesting one.

LINK-BELT

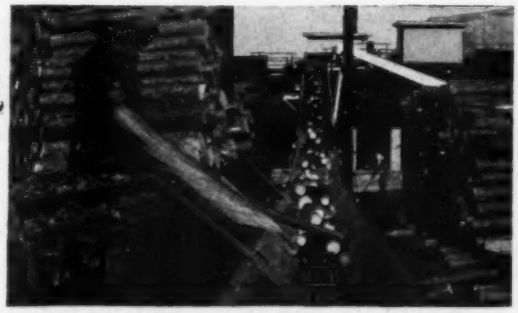
MATERIALS HANDLING AND POWER TRANSMISSION MACHINERY

SERVES THE ENTIRE PULP & PAPER INDUSTRY

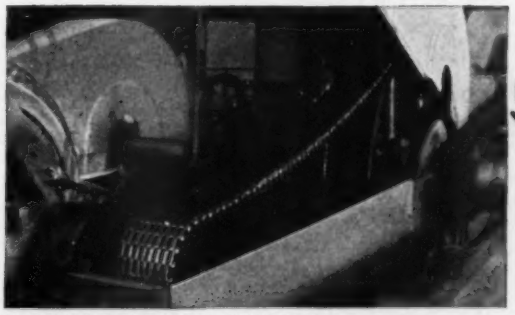


3 BULK-FLO CONVEYOR-ELEVATOR Units Handling Wood Chips Efficiently and at Low Cost.

P.I.V. GEAR VARIABLE SPEED CHANGERS Accurately Control Speeds on Cutters, Press-Rolls, Coaters, Pumps, etc.

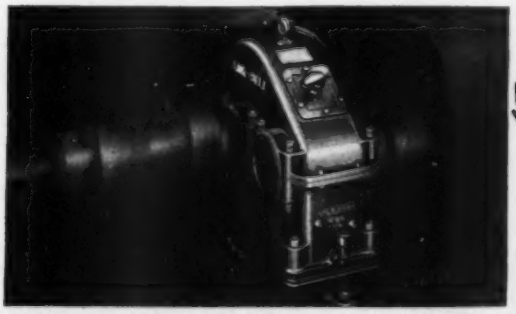


CHAINS FOR CONVEYORS & ELEVATORS . . . There Is a Standard Link-Belt Chain for Every Service.



SILVERSTREAK SILENT CHAIN DRIVE . . . The Ideal Drive for Beaters, Pumps, Calenders, etc.—Wherever Long Life and Efficiency Are Desired.

BELT CONVEYORS Assure Low Cost Handling of Sulphur, Lime, Salt Cake, Wet Pulp, etc.



SPEED REDUCERS For Every Service—Herringbone, Worm, Motorized Helical Gear Types.

OTHER LINK-BELT PRODUCTS INCLUDE: Chains and attachments of malleable iron, Promal and steel . . . Silverlink Roller Chains and Sprockets . . . Log Hauls . . . Slasher Table Chains . . . Conveyors to and from barking drums . . . Chains for suspending and driving barking drums . . . Sorting Table Conveyors . . . Chip, Chemical and Refuse Conveyors . . . Log Stackers . . . Hogged Fuel Handling Equipment . . . Skip Hoists . . . Conveyors of all types . . . Automatic Underfeed Screwtype Stokers . . . Portable Conveyors, Loaders and Unloaders . . . Vibrating Screens . . . Water-Intake Screens . . . Roto-Louvre Heat Dryers and Coolers . . . Screen type Dryers . . . Car Spotters . . . Sprockets . . . Gears . . . Pulleys . . . Couplings . . . Clutches . . . Ball, Roller and Babbitted Bearings . . . Grease Cups . . . Safety Collars . . . Base Plates . . . Shafting . . . Paper Roll Handling Equipment . . . Special Machinery, etc. Catalogs sent on request.

9834

As specialists in the design, manufacture and application of materials handling and power transmission machinery for all industry, Link-Belt engineers have learned how to apply an extensive knowledge and experience, effectively, to the solution of all kinds of materials handling and power transmitting problems. Because Link-Belt makes many types of conveyors, chains and power transmission machinery, we can be of incalculable service in recommending the equipment most certain to aid in attaining efficient production.

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8. Offices, factory branch stores and distributors in principal cities.

Sound the Alert!

MANAGEMENT
LABOR

—for the 5th War Loan drive during June and July. The need for the 5th War Loan is immediate, crucial. For impending events may make the 5th the supreme financial effort of the war.

The U. S. Treasury has set the overall goal at $16,000,000,000 — $6,000,000,000 from individuals alone. This is the biggest sum ever asked of the American people—*and it must be raised.*

That's why the U. S. Treasury asks Management and Labor to sit down together and organize—NOW!

For organization—good organization—has been responsible for the excellent showing of the payroll market. And its most important single superiority has been personal solicitation—desk to desk, bench to bench, machine to machine personal solicitation. 71% of all persons on payroll deductions were solicited for the 4th War Loan.

Now, to personal solicitation, add the sales incentive of a definitely established plant quota. Build your campaign around a quota plan. Set up departmental goals. Stress percentage of participation figures. Stimulate group enthusiasm.

In planning your quota campaign, work in close cooperation with the Chairman of your War Finance Committee. Everything is set to make the 5th War Loan drive a huge success—with your help!

(Note: You've read this message. If it doesn't apply to you please see that it reaches the one person who can put it in action!)

Here's the Quota Plan:

1. Plant quotas are to be established on the basis of an *average* $100 *cash* (not maturity value) purchase per employee.
2. Regular Payroll Savings deductions made during the drive accounting period will be credited toward the plant quota.
3. 90% of the employees are expected to contribute toward raising the cash quota by buying extra 5th War Loan Bonds: 1—Outright by cash. 2—By extra installment deductions. 3—By extra installment deductions plus cash.

Example: **JOHN DOE Mfg. Co.** — 1,000 Employees

1,000 employees x $100 Regular Payroll deductions during the eight weekly payroll Accounting Periods of June and July = $100,000 Cash Quota

30,000
$70,000 (to be raised by sales of extra Bonds to at least 900 employees)

ORGANIZE • SOLICIT • DELIVER

The Treasury Department acknowledges with appreciation the publication of this message by

THE PAPER INDUSTRY and PAPER WORLD

★ ★ *This is an official U. S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council.* ★ ★

and every "egg" is part PAPER

For every 500-pound bomb, twelve pounds of paper are needed for rings, fins, tops and bottoms. Paper makes the protective bands and the fin locknut protectors.

The bomb-body shipping bands (removed by hand just before the bombs are loaded into planes) are now made of paper—saving 4000 tons of steel each month. These paper bands are waterproof—able to stand terrific heat (up to 600°). And they withstand the drop test better than the steel rings previously used.

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KENWOOD WOOL PRODUCTS

F. C. HUYCK & SONS

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F. C. Huyck & Sons is proud to be serving an industry so essential to the war program. Our skill, our facilities and our 72 years of experience are always available in solving the special felt problems created by urgent wartime paper needs.

EFFICIENT RYERTEX BEARINGS Speed Paper Production

Good bearings . . . the best you can get . . . are always a sound investment, because they are less expensive to operate and they last longer.

Ryertex Bearings are especially well suited to the paper industry because they work well with all types of lubricants . . . water, oil, grease or any combination according to the application. Ryertex has a much lower coefficient of friction than metallic bearings and outlasts them many times.

Installations of Ryertex more than pay for themselves through power savings, lubricant savings (when water is used) and in long trouble-free life. Each bearing is individually engineered and custom built. All bearings are designed to meet the particular requirements of the operation, and to give maximum support with a minimum of friction.

You can profit by the experience of Ryertex engineers. For over fifteen years Ryertex non-metallic bearings have been used in a wide range of industrial applications. Let us show you how Ryertex bearings are helping others . . . and how they can serve you to advantage. Write for descriptive bulletin, or send details of your bearing application for prompt recommendation.

In Case of Accident . . .

Because Ryertex bearings last so long and are so trouble-free—we find too many of our customers trying to get along without spares.

However, even with Ryertex bearings accidents may happen—lubrication is overlooked, a roll breaks, etc. —so in wartime when it is difficult to get 24 hour replacements, we urge that you play safe and keep spare bearings on hand.

JOSEPH T. RYERSON & SON, INC., PLANTS: CHICAGO, MILWAUKEE, DETROIT, ST. LOUIS, CINCINNATI, CLEVELAND, PITTSBURGH, PHILADELPHIA, BUFFALO, NEW YORK, BOSTON.

RYERSON

Preparing the Paper Industry for Peace

JOHN G. STRANGE, Secretary
The Institute of Paper Chemistry

▸▸▸ SOME MIGHT SAY THAT an industry engaged in a struggle to meet war quotas cannot gracefully think of preparing for peace. First things first, they would argue. Solve your war problems before dissipating energy on what is to follow. There are obvious fallacies in such a viewpoint.

In the first place, one assumes that our goal is not to win the War at any price. We aim to win, yes, but in a manner that will fortify the principles which originally led us to battle. It should be recognized that war and peace, instead of being clearly distinguishable, are concommitants and that one is the harvest of the other. Thus, intelligent planning for peace is an indispensable feature of "all-out" warfare, and it is incumbent upon industry to face the future, prepared to act as a vigorous integral of a sound economy. There are many elements to such planning, among them are production and development.

It has been suggested that postwar production goals can be epitomized very simply by the slogan, "reduce operating costs." This is an alluring deduction because it sounds thoroughly practical and seems to get to the core of the problem in a two-fisted, forthright manner. Unfortunately, the slogan falls apart under analysis, a tragedy common to all over simplifications.

In the first place, there is little point in reducing the manufacturing costs of an outmoded article. Price is not the only factor in distribution. Utility and appearance are surely two of the other considerations. These must be weighed carefully before one plunges into an economy program. And, in their weighing, one is concerned not only with existing relationships, but also with the developmental possibilities that appear to reside in his product and its rivals.

Second, there may be a difference between short and long range costs. The adage of "penny wise and pound foolish" is of interest here. Technological advances, geographical obsolescence, or the ebb of raw materials may outmode a well-oiled plant. A modest amount of crystal gazing would appear to be prudent before any sizable furbishing is undertaken.

Finally, operating costs are not determined exclusively within the plant. They may be raised or lowered by provincial or national legislation, entirely aside from excises or regional barriers. There are, for example, the drives toward sanitation, minimizing of pollution, and special community obligations which may demand practices not ordinarily considered when one is concerned solely with production measures.

It would not be difficult to select other factors which complicate the ostensibly simple objective of "reducing costs." Perhaps enough has been said, however, to indicate the spaciousness of the assignment, and, with this in mind, we can examine briefly (and inadequately) some of the production and development problems of the pulp and paper industry.

It is clear that the basic position of the industry is extremely sound. Fundamental is the fact that its primary raw material is a crop. In this respect there is an important difference between paper and products derived from minerals or reservoirs which have been variously situated by the Creator and which are not inexhaustible, at least within given areas or localities.

Unfortunately, the industry has not always recognized the "crop principle" and sometimes has exploited its sources of fiber as if they were a one-time proposition. In so far as this practice has been followed, the industry has forfeited one of its outstanding advantages. In any consideration of the future, therefore, one is bound to place two objectives high on the list. First is a well conceived program of reforestation with careful consideration of all issues that bear on more prudent handling and replenishment of fiber, and second is the more versatile use of species which have been widely viewed as inferior to, or less desirable than, the traditional softwoods.

Recent years have seen an enormous amount of work on "substitution of species" and certain hardwoods, for example, are responsible for climbing percentages of the industry's furnish. It is manifest, however, that more emphasis must be given to this trend if at least an ephemeral balance is to be attained between the supply and consumption of our national wood pile. Although development along these lines will be more pressing in some sections of the country than others, the issue is fundamental to all sections.

In considering the broad picture, tonnage figures frequently lead one to overlook fibers other than wood. The remarkable strides made by flax in tissue and specialty grades should suggest other developments. Wartime scarcity of hemp and rope likewise has rejuvenated interest in more or less esoteric fibers. Even more important, from the long-range standpoint, is the shifting of our agronomy and the effect of such shifting upon companies that have depended primarily on certain farm crops, such as wheat straw. Increased attention is sure to be given to other crops as sources of fiber. Finally, the rag paper industry is faced with certain long pull trends in the textile field. What, for example, will be the future as regards synthetic fibers and, if synthetics gain importantly, what bearing will this have on rags as a raw material? Too, as methods of fast-dyeing and waterproofing spread in textiles, there will be many investigations of how best to process such materials.

As a corollary to fiber preservation, there is the problem of waste disposal. Public insistence has underlined the angle of stream pollution, but entirely aside from this enigma the industry long has recognized the fallacy of throwing away over one-half of the wood on which it pays freight, handling, and storage charges. Enormous sums have been expended in seeking answers which would be compatible with the volumes involved and with our national economy. In spite of previous failures, it is safe to anticipate renewed studies of waste utilization. Cooperative programs in the Midwest, on the West Coast, and now, through a national organization, are merely indications of the planning to be expected in this field. For several years to come there will be appreciable activity on the minimizing or elimination of wastes and pollution of all kinds.

Wartime research appears to have placed considerable emphasis on electronics and methods of automatic control. It is generally expected that efforts will be made in peacetime to apply these technics more widely in manufacturing. The pulp and paper industry may have many opportunities in this line. Elimination of human variables and simplification of handling are attractive goals. Automatic regulation of caliper and moisture content come immediately to mind. The finishing operation in many mills seems unnecessarily laborious. This same observation can be carried back to the wood room, methods of bark-

ing, and chip handling. The growth of machine coating, and its inevitable boom in the postwar, merely typifies the sweep toward streamlining, integration and extension of control methods.

One may expect that the consumers of paper also will be influenced by the trend toward instrumentation. This means that they will endeavor to define more exactly their use requirements and that they will request closer control of the features they feel are important to their own process or product. Clearly, there will be need for a better understanding of mutual problems and a correlation of efforts to solve them. A good illustration is found in the field of graphic arts. Future developments will require a synchronization that can only be achieved by an improved and more complete technical and educational fraternity among the papermakers, ink producers, equipment builders, and printers. The same can be said of the container and packaging fields.

One of the most significant developments in the modern paper industry is the growing use of non-fibrous materials. Whereas pigments, fillers, and adhesives have been employed for years, war requirements and improved resins and mucilages have stimulated activity, resulting in many advancements. The concept of fiber as a skeleton around which one builds the flesh and muscle of these other materials seems to be growing and there are exciting possibilities. A favorite illustration is the development of the weatherproof container. Previously, certain fruits, vegetables, and other commodities were not carried in paper because the hazards of water, humidity, or temperature were regarded as too severe. It has been convincingly demonstrated that fortified paper boxes are entirely adequate for such purposes. This discovery would seem to jibe well with anticipated developments in the cold storage of foods and consequent packaging requirements. The progress which has been made in proofing paper against oils, greases, and vapor suggests other applications, although improvements in glass containers, metal foils, and synthetic films will offer aggressive competition. In some instances paper may merge with these other materials, forming functional layers, each contributing its particular advantages to the integrated barrier.

While the new nonfibrous ingredients are discussed most frequently in terms of functional papers, there is much to be said on their future in cultural grades. Increased strength through chemical means may spread the use of lower-cost fibers. By improvement of formation through mucilages important savings are already being realized in reduction of refining and power requirements. Stronger adhesives may enhance coating characteristics and receptivity to oils or inks may lead to better and faster printing. There is the possibility of increasing resistance to abrasion and of adding to erasability. Better dimensional stability will improve register in printing. Added wet strength will satisfy new use requirements and suggest new markets.

There has been much speculation over the use of paper, and of pulp by-products, in the plastic field. Outstanding is the development of impregnating paper for low-pressure, high-strength laminates. It is certain that the last chapter has not been written in this story. Until now the advantages of high tensile strength and low water pickup have been somewhat diluted by relatively low impact strength and low ductility. These deficiencies are slowly being corrected and it is safe to predict continued progress in this direction. While there is abundant information on the "static" properties of paper laminates, more data on their "dynamic" behavior is required. There is good reason to expect many peacetime applications, since the material lends itself to forms and shaping that are not easily accommodated by its competitors in the plastics field. The combination of paper with other structural materials such as wood veneers, metal foils, and decorative plastic fibers offers many possibilities. Similarly, one feels that the much maligned lignin plastics will serve many purposes, both in their own right and as extenders for more costly resins. Those who have seen the accomplishments of molded pulp during the war are impressed with the strides of this article. In its application it is akin to many of the regular plastics. Progress in molding technics and use of new resins suggest that larger and more durable products from molded pulp will satisfy quite a few postwar markets.

Economists feel that housing will be one of our largest and most sustained peace industries. Whether emphasis will be placed on custom-built or prefabricated dwellings is a matter of conjecture. In either event, the paper industry will find substantial markets. Insulation and building boards have benefited by the non-fibrous materials mentioned earlier, and they will benefit even further. The opportunity exists for using paper in structural elements and in heating and conditioning systems, as well as in protective barriers. Within the house itself, one may expect extended use of paper for wall coverings, rugs, window shades, and even furniture. The ruggedness and versatility contributed by paper's new "muscles and flesh" will be useful in these fields.

Scarcity of metals, rubber, and foreign fibers has given paper many wartime opportunities to prove its versatility. Particularly arresting have been the achievements of paper shipping sacks and multiwall bags. Their ability to carry hygroscopic materials and even corrosive chemicals indicates peacetime possibilities. As in the case of boxes and other packaging media, however, there is need for more basic information on use requirements and there is ample opportunity for further investigation of primary construction features.

While one is attracted by the spectacular elements that reside in planning or development, he knows full well that over-all progress will be more in the nature of a slow crescendo than a series of high notes. The gradual improvement of bleaching mechanisms, the deliberate conquering of bacteria and other organisms that are more devastating than the industry sometimes appreciates; the inching up of operating speeds, the laborious stemming of wastes, the steady enhancement of quality are merely illustrative of this point. It is almost axiomatic that the older an industry is (and paper is one of the oldest), the greater is its need for fundamental investigation. The reason is clear. Born before, rather than as a result of, modern science, old industries have accumulated through the years a tremendous backlog of empiricism. Trial and error are responsible for an almost overwhelming wisdom—and also for a most confusing collection of old wives' tales. In this environment, success is best assured by patiently working on the fundamental mysteries of the industry, and they are plethoric. This is one of the fascinating aspects of pulp and paper.

There is scarcely a field of science that does not impinge on paper. It is gargantuan in its consumption and disgorging of both organic and inorganic materials. Its process is primarily colloidal. Its machinery is an engineer's paradise. Its finishing and application involve complicated physical principles. Its production and use present manifold problems for the biologist. In short, there is an abundant hunting ground for all branches of technical fraternity, And this observation leads to the most important element of any planning for the future.

We are prone to think of the future in terms of materials and processes. Actually, an industry's success is directly proportional to the moral and intellectual stature of the men who

(Concluded on page 311)

Barking Pulpwood Hydraulically

R. K. PRINCE, Manager, Cellulose Industries Division
Allis-Chalmers Manufacturing Company

▸▸▸ A LOG BARKER which promises to reduce the loss of pulp in the barking process by 10 to 15 per cent, the first practical hydraulic barker ever to be designed for standardized production, has been perfected by the Allis-Chalmers Manufacturing Company.

Known as the *Streambarker*, the machine realizes an old idea that water pressure can be used to remove the bark from pulpwood sticks, a theory which heretofore could not become a fact (even though paper patents have been granted for such hydraulic barkers), because no practical mechanical and hydraulic combination could be found.

The barker developed by Allis-Chalmers technicians removes quickly and cleanly bark from logs ranging in diameter from four to 18 inches, and in length from four to eight feet and eliminates final hand finishing.

The speed of barking depends upon many factors including the time of year, the type of wood, the size of wood, and whether or not the logs are frozen. However, performance under average conditions has approximated 10 cords per hour based on 90 four-foot logs per cord.

The Allis-Chalmers machine is designed to bark or wash reasonably straight logs which are fed in a straight-line, single-trough channel, butt to butt, to specially-constructed bed rolls in the Streambarker. The logs pass under three water jets located parallel with and directly over the axis of the log.

The two bed rolls are arranged to rotate in the same direction at different speeds in order to turn the logs and to convey them forward at the same time. Both rolls are 24 inches in diameter by 10 feet in length, one fluted lengthwise, the other with spiral thread. The sharp threads of the rolls score the bark, increasing the number of points for entry of the hydraulic jets, producing smaller bits of bark which are more easily handled on a bark screen and conveyor.

The bed roll surface plates are made of special wear-resisting cast iron and are so designed that they can be removed in longitudinal sections for replacement without disturbing the roll proper.

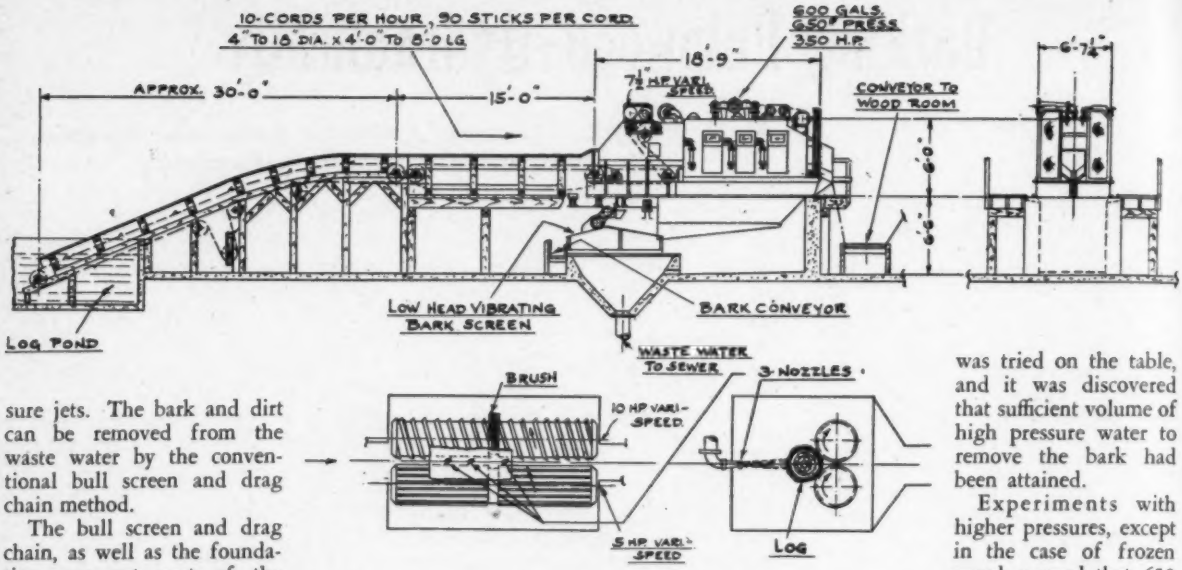
The water jets are provided with specially-designed nozzles equipped with removable tips whose apertures permit the water to hit the log in a compact pattern. The nozzles are secured to a heavy cast steel header located on top of the machine. In case the bark comes off easily, one or two of them can be shut off by the use of blank tips.

A flexible steel-wire brush constructed of six reversible sectional parts adjustable radially for wear is located just before the third jet on the path of the logs through the barker. The brush, which removes any dirt or slimy red tail that may remain on the log after the first two jets remove the bark, is set in the spiral bed roll.

The brush sections project slightly beyond the bed roll surface, and brushing action is accomplished by the difference in speed between the surface speed of the log and that of the spiral roll.

The final jet completes the washing action.

The machine is constructed with a straight-line base and plate steel sluice to be mounted on the mill's foundation with a suitable pit for collecting the waste water from the pressure jets, together with the dirt and bark cleaned from the logs. The waste water with bark can be screened and the water repumped to the pres-



sure jets. The bark and dirt can be removed from the waste water by the conventional bull screen and drag chain method.

The bull screen and drag chain, as well as the foundation, are not part of the Streambarker, however, and, if used, must be oriented to suit the installation.

The frame of the barker is of reinforced heavy steel plate and completely houses the bed rolls and water jets. It is provided with waterproof doors and glass-plated openings for accessibility. Floodlights inside permit observation of the logs as they pass through.

Baffle plates with oil control cylinders are provided to hold the logs firmly in place and to direct the flow of waste water from the jets into the sluice.

The bed roll shafts are supported in heavy self-aligning roller bearings mounted in water-tight housings on the outside of the machine. All other bearings, both antifriction and babbitted, are mounted on the outside of the frame and can be lubricated easily.

The machine is provided with an infeeding bed chain which is a special cast steel buckhorn chain running parallel to the axis of the bed rolls. The shape of the wings on this bed chain corresponds in contour with that of the bed rolls in order that all diameter logs will enter the crotch of the rolls in a straight line.

There is also a top feed chain which is mounted directly above the bed chain and which is supported in a counter-balanced swing frame. Both chains are driven at a synchronized speed.

The Streambarker itself can hold only a four-foot log, but a short conveyor can be attached to the discharge end of the machine so that logs of eight-foot length can be put through.

The feed works chains and the short conveyor leading to the feed works are driven by a 7½ hp. motor and variable speed changer mounted on the top of the machine. The bed rolls are driven through connecting chain and sprockets, the spiral roll by a 10 hp. motor, the fluted roll by a 5 hp. motor. Both motors have variable speed changers and all are mounted on the top of the machine.

The pumping unit used by the Streambarker consists of a high head centrifugal four-stage pump delivering 600 gpm at 650 pounds gage pressure. It requires a 350 hp. motor at 3600 rpm. The pump can be turbine driven if desired.

As tests proved that the barking of frozen wood required about 100 additional pounds pressure, it has been made possible to couple a booster pump in the Streambarker's suction line. The booster requires a 60 hp. 3600 rpm motor to raise the 750 pounds pressure.

Although the idea of a machine which would remove the outer covering of logs with high pressure water was conceived many years ago, it remained for Allis-Chalmers men to find the ideal equipment for this purpose.

Several years ago in the foundry of the Allis-Chalmers West Allis Works, a means of cleaning sand from castings other than the traditional hand method was sought, and it was decided to try water under high pressure. Foundrymen went to the centrifugal pump department of the company where the pump which was later to be used in the Streambarker was developed.

An enclosed room was established in the foundry where castings were placed on a revolving table and were played on by a high pressure stream from the pump. Eventually a log was tried on the table, and it was discovered that sufficient volume of high pressure water to remove the bark had been attained.

Experiments with higher pressures, except in the case of frozen wood, proved that 650 pounds was just about the ideal pressure for the purpose, and that the ideal distance for the nozzles from the logs was to set them 28 inches from a 10-inch log.

In early experiments at Allis-Chalmers, a great many shapes of nozzle tips were designed and tested. The desired effect was a compact three by five inch pattern of water on the bark surface, and eventually it was found that an elliptical-shaped aperture met this requirement.

As was common with many early experimenters, Allis-Chalmers men thought that the proper method of applying the water pressure was to project the jet in a cutting stream on a tangent to the log surface to get a chiseling effect.

Experiments proved that the chiseling or cutting action would not work at all, and that best results were obtained by placing the jets so that they were radial with the center of the logs and 90 degrees to the length of them. In this way the blasting or erosive action applied in the Streambarker is facilitated by a pond, not because of any benefit secured from soaking or washing of logs in the water, but because logs are more easily fed to the barker from a pond by means of the conventional log haulup chain than they could be fed dry from stockpiles.

While the advantages of the Streambarker will be generally the same in all installations, they will vary in some degree at each location, just as the performance of the machine will vary as it is affected by the time of year in which the wood was cut, the type of wood, and the wood sizes.

The saving in pulp because of the non-brooming of log-ends, unneces-

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Vested Patents and the Paper Industry During and After the War

JULIAN F. SMITH, Senior Chemical Specialist*
Chicago Office of Alien Property Custodian

▸▸▸ MANY U. S. PATENTS and patent applications relating to paper, formerly under enemy control, have been taken over by the Alien Property Custodian. Attention of paper experts was directed to these vested patents by M. P. Chaplin in his enlightening discussion, "Patents and the Paper Industry" (THE PAPER INDUSTRY AND PAPER WORLD, February, 1944, p. 1222).

In his *Foreword* to "Abstracts of Chemical Patents Vested in the Alien Property Custodian" the Custodian says that he "has undertaken to make U. S. foreign-owned patents which he has seized immediately available to the public in a manner which would produce the greatest benefit with the least effort in an economy geared to the exacting demands of total war."

The offer of vested patent rights for public use is in effect a challenge, and the paper industry joins others in accepting it as such. The Institute of Paper Chemistry, in twenty-four reports to the American Paper and Pulp Association, has supplied paper experts with abstracts of vested patents in ninety-seven U. S. Patent Office classes. The trade press also has given attention to vested patents relating to paper. With such aids the challenge is being met.

At present, the Alien Property Custodian's principal contribution toward wider dissemination and easier study of the vested patents is his series of printed abstracts of the vested chemical patents and applications. These were prepared and published with the aid of the Chicago Section, American Chemical Society and the Science-Technology Group, Special Libraries Association. Without their help, contributed by some three hundred volunteer workers (about two hundred and fifty chemists and fifty librarians) the project would have consumed far more time, probably too much to produce a useful result before the war ends.

These abstracts are published in thirty-one classified sections, a supplement and a master index at $1.00 each ($25 for the entire set). Some of the section titles in which paper experts will be interested are Unit Operations; Colloids; Heavy Chemicals; Derivatives of Natural Products; Photography; Plastics; Textiles; Dyes, Dyeing Processes and Textile Chemicals; Wood, Paper and Pulp, and Protective and Decorative Coatings.

Scope and Number of Vested Patents and Applications

As indicated by Mr. Chaplin's table of vestings under selected U. S. Patent Office classes, there are 423 patents and 72 applications in four classes so pertinent that their titles mention paper. In 13 other classes, more or less closely related, there are 4,201 patents and 821 applications.

Many suggestive or informative patents and patent applications are scattered through other Patent Office classes; no count can be made since every reader has his own concept of what is suggestive or informative. In the printed abstracts of vested chemical patents there are 108 cross references from "Wood, Paper and Pulp" to textiles, foods, colloids, leather, photography, unit operations and other classes.

In Section 27 ("Wood, Paper and Pulp") of this series there are 175 abstracts in three parts; namely, wood products (56 abstracts); pulp and paper, including paper chemicals (111 abstracts); waste liquor disposal or utilization (8 abstracts).

Utility of Vested Patents

Patents vested in the Alien Property Custodian are probably somewhat higher in average merit than the mass of U. S. patents. Their European or Japanese inventors have considered them worth the extra effort and expense of filing and prosecuting the U. S. patent application.

It is well known that patented inventions vary enormously in profit-making capacity. For every potential millionaire among them there are many potential beggars. The same is true of the vested patents, though their average prospects are presumably brighter than the over-all average.

Profit in exploiting an invention depends so largely on initiative, ingenuity, energy and business acumen that no one is qualified to estimate the prospects unless he is chin-deep in the exploitation. Outsiders can evaluate a collection of patents only by hazarding thumbs-up or thumbs-down guesses. Hazard will be the main element in the result, with many patents assigned to the wrong category.

Excepting only freak inventions such as perpetual motion (no vested patents) and cheap, large scale transmutation of matter (one invention is known) offhand condemnation of any

Visitors at a recent alien properties custodian exhibit.

(*) Present address: Institute of Textile Technology, Charlottesville, Virginia.

patent is risky. An expert may say it is worthless, only to have some ignorant nobody (who doesn't know it won't work) step in and make it click. The expert didn't read between the lines.

Conversely, many of the uninitiated (and experts too) have placed their money on sure winners which actually got left at the post. Again, the failures of yesteryear may have been ahead of their time; under today's conditions and improvements some of them may be profit makers. Sometimes the right man resurrects a dud long buried in the past, and for him it goes over with a bang.

There is a vested Japanese invention for making medicinal wine from chopped snake meat in a few weeks instead of the customary 50 to 100 years. Even this might have merit in the right hands; the inventor says his method also works with ginseng root. So the snake wine patent is presented for the attention of prospective licensees quite as solemnly as the most outstanding invention in papermaking or packaging or munitions of war.

In offering vested patents to the public under non-exclusive licenses the Alien Property Custodian does not commit himself to any opinion concerning their merit or validity. He does, however, agree to defend vested patents, and hence their licensees, against any suits filed by former owners to recover their patent rights. He will also participate, after the War, in negotiations with owners from occupied countries since their patents were vested as a measure of protective custody and not by confiscation.

Opportunities for Use of Vested Patents

Vested patents or patent applications may help the war effort either through direct use by the Armed Forces or government departments serving them, or through use in factories engaged in war production. Licensees may employ these inventions in work not directly concerned in prosecuting the War, but important on the home front. It is to be anticipated that great numbers of the vested patents and applications will contribute toward the postwar transition to a peacetime economy.

Doubtless some of these contributions will be large and spectacular, but the vested patent rights can aid postwar industrial development most effectively if many licensees put many patents to work, each adding its rightful share (whether small or large) to progress. The best effect of all will be achieved if licensees apply their ingenuity to improving the inventions under which they are licensed. Patentable improvements become the exclusive property of the licensee, now turned inventor.

Consider these possibilities in relation to a purely hypothetical example, evolved by allowing the imagination to play freely around an actual vested patent. This patent was selected entirely at random from the Institute of Paper Chemistry "Report to the American Paper and Pulp Association: Patents Vested in the Alien Property Custodian" (April 8, 1943), covering U. S. Patent Office classes 8, 91, 93, 154 and 229. The choice fell on U. S. P. 2,154,953, April 18, 1939, issued to Christian Majer. It relates to a machine for making straight or tapered paper tubes.

Suppose the Quartermaster Corps needs several million tubes for packaging a standard field ration. Tubes are being made slowly and painfully, in a blue haze of profanity, on a machine that breaks down if the operator sneezes. Imagine the Majer machine maintaining a tenfold faster production rate without letup. The blue haze disappears. The young lieutenant in charge (perhaps his blue star is on the flag in your factory) gets a night's sleep.

Again, suppose an airplane assembly plant passes rivets in metal buckets to each job. The buckets get mauled and battered; metal is scarce; a wide tapered paper tube, easily replaced if flattened in service, will do the same work. Suppose one Majer machine will turn out blanks faster than a dozen assembly plants wear out the paper rivet buckets. The vested patent scores again.

Or suppose you can't get paper for a product which people need in everyday living although it feeds no fighting force and passes no ammunition. You wear your thinking cap long enough to design a detachable modification enabling the Majer machine to form pulp tubes on a mandrel. Your license under the vested patent permits you to use the machine either with or without your new gadget. If your improvement is patentable its patent rights are exclusively yours; other licensees are limited to the vested patent unless they also have made improvements. Meanwhile, you have found a way to produce the desired article.

Now consider your own postwar prospects. What could you do with this machine? (Possibly you have a better one, but this is a hypothetical case). If you make machines you may wish a license to make and sell the Majer machine. If you make paper goods you may want the license because you can make a familiar article at low cost, or because you know how to use the machine on an entirely new product. Whoever you are, your American ingenuity is free to change this machine into a better one.

How many jobs could you offer to returned veterans, or how many handicapped veterans could you help to rehabilitate, as a licensee under this patent? How much would the license help you in meeting the postwar demand for consumer goods? These and many other questions merit your attention when you analyze the potentialities of a vested patent or application.

Licensability of Vested Patents

Since over 40,000 patents (not including applications) were vested, and each is good for 17 years, the average rate of expiration is over 2,300 per year. Vested patents are not quite evenly distributed as to date of issue, but over 3,200 patents have expired (as of June, 1944) since they were vested. They are now public property, usable without a license.

Some vested patents were exclusively licensed to Americans under prewar agreements. These licenses are respected by the Alien Property Custodian unless they impede full utilization of the invention in the war effort. In that case the exclusive license will be revoked and non-exclusive licenses will be offered on the usual terms.

Sometimes the holder of a prewar exclusive license surrenders it in return for a non-exclusive license. He invites competition by making his rights public property, but he releases himself from royalty payments.

Thus non-exclusive licensing of vested patents is barred by prewar exclusive licenses to Americans, but the bars may be and sometimes are taken down.

Some of the corporations vested in the Alien Property Custodian are extensive owners of U. S. patents, not separately vested. The owner may elect to work these patents, or to grant exclusive or non-exclusive licenses under them, at his own discretion and on his own terms.

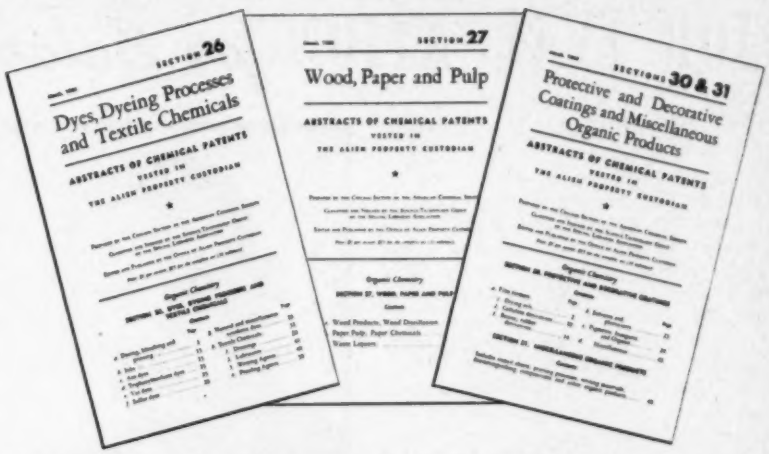
A prominent example is the Schering Corporation. With its subsidiary, Sherka Chemical Company, it owns many U. S. patents, some of which the corporation has retained for its own use. Others are offered for non-exclusive licensing on a reasonable royalty basis, agreed on by negotiation with each licensee. Schering Corporation has published a list of 188 patents thus offered for license. Of these, 15 in photography, 16 relating to cellulose acetate and 61 on miscellaneous subjects may be of some interest to the paper industry.

Vested corporations are under control of the Alien Property Custodian; their patent administration policy is essentially the Custodian's policy, but it is carried out by the corporation.

Applicants for licenses under its patents must deal with the corporation, not with the Alien Property Custodian.

Some patents were vested in error, for example when the inventor appears as an alien in the Patent Office records but since then has acquired American citizenship. In such a case the patent is divested and is no longer available to the public.

Applicants for licenses can readily obtain the information needed to distinguish between vested patents and patents owned by vested corporations. To ascertain whether a vested patent is free from license barriers the license application should be filed with the fee ($15). The action taken is usually reported to the applicant within three days after the application is received.


SECTION 26
Dyes, Dyeing Processes and Textile Chemicals
ABSTRACTS OF CHEMICAL PATENTS VESTED IN THE ALIEN PROPERTY CUSTODIAN
SECTION 27
Wood, Paper and Pulp
ABSTRACTS OF CHEMICAL PATENTS VESTED IN THE ALIEN PROPERTY CUSTODIAN
SECTIONS 30 & 31
Protective and Decorative Coatings and Miscellaneous Organic Products
ABSTRACTS OF CHEMICAL PATENTS VESTED IN THE ALIEN PROPERTY CUSTODIAN

Classified sections of abstracts of vested chemical patents and applications which are being published by the Alien Property Custodian.

Selecting Patents for License

Every vested patent or patent application is potentially a weapon for victory and a tool for building the postwar economic structure. Unexpired patents, not barred by divesting or prewar exclusive license, can be licensed as your own weapons and tools for victory and peace. Many of them are directly related to pulp, paper and paper goods; many others are adaptable to the plant and machinery employed in the paper industry.

Everyone has a good chance to strike pay dirt among the licensable inventions if he is interested in process or product improvement, new production lines or smooth adjustment of postwar operations to postwar conditions. Prospectors will naturally look first in the most pertinent U. S. Patent Office classes such as 92 (Papermaking), 93 (Paper Manufactures) or 229 (Paper Receptacles). The 24 reports prepared by the Institute of Paper Chemistry for the American Paper and Pulp Association will be helpful to Association members, not only in those classes but in many others since the reports cover a wide range of patent classes.

The Alien Property Custodian is publishing abstracts of the vested chemical patents and applications (about 7,000 in all). Within their scope these abstracts will greatly facilitate the search for promising inventions. They are printed in 31 classified sections, some of which are illustrated. There will be a supplement (abstracts from the most recent vestings) and a master index to the 31 sections and the supplement. The most pertinent section is 27 (Wood, Paper and Pulp), but several others merit careful scrutiny by paper experts.

Prospectors who look only in the most obvious places sometimes miss the richest strikes. Paper technologists seeking profitable licenses under vested patents or applications should go afield, for example in textiles, leather substitutes, cellulose derivatives, coatings, colloids and dyes.

Licenses

Licensing is a simple matter after selecting the candidate inventions. A single application may be filed for one or many patents, with a remittance of $15 each. If any invention in the application is not licensable the fee for that license will be refunded.

Each license is non-exclusive; any other citizen of the U. S. can have one too. It is valid until the patent expires (17 years from date of issue). For patent applications its life exceeds 17 years by the period from the license date to the issue date of the patent. If the application is rejected by the Patent Office no license is needed after the final rejection. Licenses are royalty-free but require an annual report, indicating use of the invention, to the Alien Property Custodian.

Vesting of a patent belonging to an enemy alien amounts to confiscation and the license is royalty-free throughout its term. Vesting rights of nationals from enemy-occupied countries is a matter of protective custody, not confiscation; licenses will be royalty-free until six months after the war. Then they will be subject to reasonable royalties which may be decided upon by agreement either then or at the time of taking the license.

Vested Copyrights

Copyrights owned by alien authors and publishers have been vested and many of the publications are being reprinted, nearly always by a photographic process (hence in the original language). The Alien Property Custodian makes no provision for translating, but licensees under vested copyrights may have an English translation made. Expense and delay are major factors in making translations so rare in the republication program.

When reference works, manuals and textbooks are republished the selling price is generally much lower than for the original. Reductions range up to about 80%, according to demand and other economic factors, but a few books have had to take a small increase instead of a reduction.

Current subscriptions to many foreign periodicals are offered, usually at a substantial reduction from the original subscription rate. Some republications of interest to paper technologists (original and republication prices in parenthesis) are:

Books

Faust, *Celluloseverbindungen und ihre besonders wichtigen Verwendungsgebiete* ($192, $75).

Chwala, *Textilhilfsmittel; ihre Chemie, Kolloikchemie und Anwendung* ($18, $7.75).

Beilstein, *Handbuch der Organischen Chemie,* Ed. 4, 59 volumes bound in 49 ($2,000, $400).

Philipp, *Technisch verwendbare Emulsionen,* Ed. 2, ($28.80, $26.25).

Landolt - Boernstein, *Physikalisch-chemische Tabellen,* Ed. 5 and 3 Supplements, ($365, $180).

Fischer, *Abfallstoffe der organisch-chemischen Industrie und ihre Verwertungen* ($6, $5.75).

Ullmann, *Enzyklopädie der technischen chemie,* Ed. 2, ($208.80, $220).

Periodicals

(Annual rates; original publishers' rates not quoted)

Chemiker-Zeitung, $19.00.

Chemisches Zentralblatt, $91.00.

Chemische Technik, $11.00.

(Concluded on page 315)

JOB EVALUATION *for Salaried Employees*

▸▸▸ THE ANALYSIS of a situation points the way to its solution. This statement might well be the text for a discussion of job evaluation. The job is analyzed according to certain job factors and then evaluated in accordance with the relationships of the factors of one salaried job to other salaried jobs in the company.

A number of paper mills, large, medium, and small, in the past have evaluated the jobs of their hourly rate employees, a democratic process of determining just compensation. The same method is now being successfully applied to their salaried personnel. Typical jobs in the salary group are the office workers, mill superintendents, production managers, master mechanics, technical directors, tour bosses, and timekeepers.

Scientific study reveals that low compensation is not the real "rotten apple in the barrel" which causes lowered production and poor morale. The real evil is wage inequalities which all too often exist among workers doing the same job. This fact is substantiated by the expression of workers in more than two score morale surveys conducted by our organization, including both salaried and hourly rate employees in a variety of industries. Americans, whether working for a salary or for any other form of compensation, possess a pocketbook nerve.

Purpose and Preliminary Steps

The executives of a southern papermaking and converting firm felt the need for a fair and defensible plan to measure the value of salaried jobs. Their goal embraced three points: *first,* determination of the correct values of salaried jobs; *second,* the establishment of proper minimum and maximum rates for the various positions, and *third,* merit rating to gauge how well each individual was fulfilling the requirements of his position. (Provision must be made for compensating individual merit, but merit rating will not be discussed in this article.)

To map out the work of job evaluation, the mill called in a firm of management engineers who had handled its job evaluation for hourly rate employees. At the same time, it named a general committee to be responsible for the progress of the work during which time it would be educated in the technique of the factor comparison method of job evaluation.

Department managers were given a thorough explanation of the purposes

EUGENE J. BENGE, President
Benge Associates

and objectives of job evaluation in order that they could answer questions which employees might ask them. In order to acquaint the members of the general committee more fully with the procedures to be followed and the reasons therefore, a manual was prepared, outlining the method in detail. If the full value of job evaluation is to be realized, employees should be taken into management's confidence, and should participate in the plans and procedures. Accordingly, company salaried employees were notified.

A Job Analysis Record and a Job Specification were prepared; membership of a job evaluation committee was selected.

Before the interviewing began, each analyst was furnished with "Instructions to Job Analysts." These instructions are vital because of the important part played by the analyst.

Of equal importance, are the definitions of terminology. These definitions were prepared concurrently with the preparation of the manual. They were highly important to the analyst as well as to the members of the job evaluation committee. Such terms as skill or responsibilities must be clearly defined and properly used. Otherwise, what one person considered as a skill, another might consider as a mental requirement, and some other might consider a responsibility.

The analysts interviewed the employees at their desks, recording in detail the education and job knowledge required; the character of skill involved and the time required to acquire it; the type and amount of physical effort; responsibility for equipment, money, contact with the public, records and supervision of other workers.

The interviewer's approach was friendly. It was made easy for the employee to participate and he was shown exactly what was written about his job, and his comments were solicited.

Job Factors

Job specifications, based on the job analyses were prepared. These consisted of a concise description of the job duties and pertinent information classed according to the five comparison factors:

1. Mental Requirements
2. Skill Requirements
3. Physical Factors
4. Responsibilities
5. Supervision

Department heads approved all job specifications before they were valued by the evaluating committee.

From the complete list of salaried positions, the general committee selected twenty jobs as tentative key scale jobs. The twenty "key jobs" were tasks clearly defined as to duties, whose rates were not subject to controversy, not thought to be underpaid or overpaid, and ranged in salary from the lowest to nearly the highest.

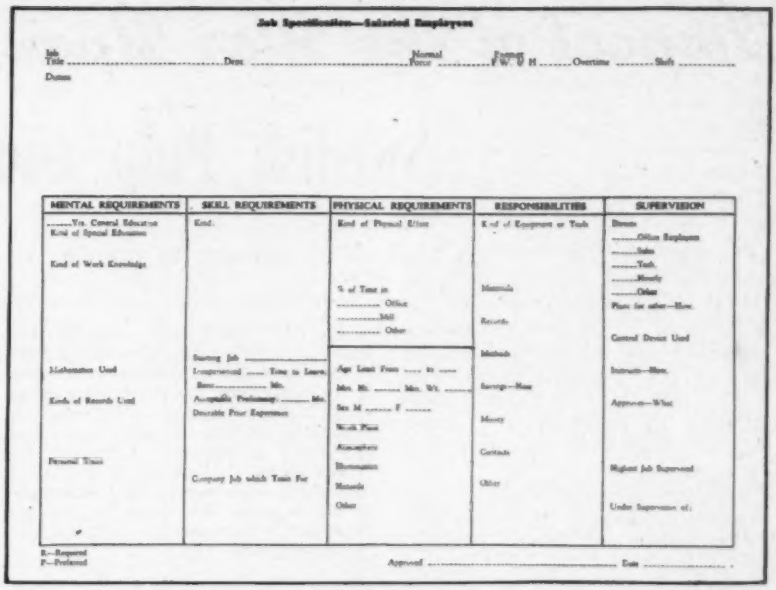
The twenty position descriptions were ranked according to their importance in each factor, from the lowest to the highest. That is, each was ranked in comparison with the other nineteen, resulting in five complete rankings. This was done without reference to the personality or the efficiency of the employees holding the positions. Next, the ranks in each factor were priced to yield a key job comparison scale. To price ranks, the present typical or average salary for each of the jobs was divided into five parts, assigning one part to each of the factors in accordance with its estimated importance. The principle of this method of comparison is that the job which has been ranked number one in a factor should also be the job which has been accorded the highest amount of money for the same factor; i.e., the job ranked first in mental requirements should also be the job granted the highest amount of money for mental requirements.

The key scale is the heart of the factor comparison method—it is the

measuring stick for each factor as a basis for determining relative values for jobs coming under the study.

The committee next compared all other salaried jobs in the company in correct order of rank for each of the five factors, one at a time, by comparing them with the key jobs on the scale for each factor. This is the evaluation proper.

The evaluated rate might be higher than, equal to, or lower than the present rate. Theoretically, there should be about as many jobs which evaluate higher than current rates as those which evaluate lower. Actually, it was found that the average of all rates after evaluation, varied only a fraction of one per cent from the average before the evaluation work was done.



Job Specification—Salaried Employees

Job Title ..... Dept. ..... Normal Hours ..... Exempt F. L. S. M. ..... Overtime ..... Shift .....

Duties

MENTAL REQUIREMENTS	SKILL REQUIREMENTS	PHYSICAL REQUIREMENTS	RESPONSIBILITIES	SUPERVISION
——Yrs. General Education Kind of Special Education Kind of Work Knowledge Mathematics Used Kinds of Records Used Personal Traits R—Required P—Preferred	Kind: Starting Job ..... Experienced ..... Time to Learn ..... Basic ..... Mo. Acceptable Preliminary: ..... Mo. Desirable Prior Experience Company Job which Trains For	Kind of Physical Effort % of Time in ..... Office ..... Mill ..... Other Age Limit From ..... to ..... Min. Ht. ..... Min. Wt. ..... Sex M ..... F ..... Work Place Atmosphere Illumination Hazards Other	Kind of Equipment or Tools Materials Records Methods Savings—How Money Contacts Other Approval ..... Date	Directs ——Office Employees ——Jobs ——Tools ——Hourly ——Other Plans for other—How Control Device Used Instructs—How Approves—What Highest Job Supervised Under Supervision of:

Applying the Findings

After approvals had been received from the WLB and Treasury Department to put the evaluation plan in operation, employees were notified regarding the grades into which their positions fell. Also they were informed as to the maximum and minimum of the particular grade of their individual jobs. Such information was given to employees individually by their superiors in order that they might know what opportunities were ahead and how they could qualify themselves for promotion or for improvement in their jobs.

Employees below the minima of their grades were brought up to these minima. If the present salary of an employee was other than shown in the normal steps of a job grade, management decided when to bring his salary in line with the step plan.

In the future, when new jobs must be evaluated or old jobs re-evaluated by reason of a radical change of duties, it was recommended that new specifications be written and jobs evaluated by the same basic procedure of factor comparison.

A committee of three was formed to carry on the evaluation work with one acting as secretary. The secretary's duty was to investigate and prepare material prior to committee discussion, to keep up to date on changes of job content, and to bring such changes to the attention of the committee for revaluation.

By-Products Valuable

Job analysis is more than the cornerstone of a job evaluation study. Its by-products offer progressive executives the material with which to build an advanced personnel and management procedure.

As frequently pointed out, worthwhile employees have an interest that goes deeper than the pay check. Nearly every new employee is interested in the job for which he has been accepted not entirely for the job itself, but for the possibilities of advancement which it offers him. The person who understands what lies ahead does a better piece of work than one kept in the dark. Therefore, with the information secured in the job analysis, management can prepare a chart showing to what other positions a particular job will lead. This chart is similar to an inverted organization chart, for it works up from the bottom rather than from the top down.

It is a truism that the beginning of labor turnover is poor selection. Conversely, good selection will aid in reducing labor turnover. One tool of good selection is an employment test based upon the requirements of a particular job. Information secured in the process of analyzing jobs is sound material upon which to develop suitable tests.

Each grade of bond, sulphite, tissue paper or any product of a paper mill must meet certain standards. Likewise the equipment, chemicals and materials used to produce these finished products must meet predetermined requirements. Therefore, it is not unreasonable to believe that the efficiency of personnel will reach new heights when employees are selected to match job standards. These standards are determined from the specific and accurate data secured in analyzing each job.

The value of competent, understanding supervisors or department heads cannot be measured in terms of dollars and cents. The majority of employees judge their company by the intelligence, knowledge, and fairness of their immediate superiors. We have found all too often in our morale surveys that workers consider that their boss lacks an understanding of the work which he directs and is not aware of the human element in handling his subordinates. In most instances management must bear the responsibility for this condition. The fault may be either poor selection or lack of supervisory training. Job analysis provides a definite guide for the development of a supervisory training program.

It is a well-known fact that in most industrial establishments 10 to 20 percent of the employees are responsible for 75 percent of the accidents. These accident-prone people are largely maladjusted persons. Some authorities have estimated that compensation costs could be reduced one-half through better adjustment of employees mentally, physically, and emotionally to their jobs. Here also the results of job analysis can be important, in addition to revealing existing hazards to the analyst at time of interview.

A personnel manager is in a position to conduct intelligent interviews when he possesses accurate job specification. In order to prepare the proper specifications for a certain job, the mental and skill requirements, physical factors, responsibilities, and supervisory requirements must be taken into consideration. Applicants can be matched against jobs through the use of job specifications.

The benefits accruing to the mills through job evaluation can be summarized as follows: (1) Stabilized labor costs; (2) job descriptions; (3) an evaluation scale; (4) a firm wage foundation for long term personnel policies; (5) satisfied employees.

Impact of the War Upon the Swedish Pulp and Paper Industry

EDWIN C. JAHN

EDITOR'S NOTE: The author is Professor of Forest Chemistry at the New York State College of Forestry, Syracuse University, and Research Collaborator, U. S. Department of Agriculture. Dr. Jahn is studying the pulp and paper situation in Sweden and Finland. He has visited England, while over there, and an article written by him describing the paper situation in England appeared in the November, 1943, issue of this magazine.

▸▸▸ SWEDEN IS ONE OF the world's principal suppliers of pulp. Due to her geographical situation, the War has cut her off from her leading markets. Under this severe impact the industry has developed certain new trends, some of which, like fodder cellulose, are temporary, and others, such as viscose pulp, are likely of a permanent nature.

Sweden's annual practical capacity for pulp production before the War, in the various categories of *pulp for sale* are indicated as follows: (All pulp quantities in this article are given in metric tons of 90 per cent dry pulp).

Sulphite pulp	Tons
Viscose and dissolving grades	275,000
Bleached paper pulp	200,000
Unbleached paper pulp	950,000
Total Sulphite	1,425,000
Sulphate pulp	
Bleached paper pulp and dissolving grades	120,000
Unbleached paper pulp	800,000
Total Sulphate	920,000
Mechanical pulp	375,000

The highest production figures were attained in 1937 when actual production amounted to 93 per cent for sulphite and 99 per cent for sulphate of practical capacity as above. Corresponding figures for 1939 were 83 per cent and 80 per cent, respectively.

The practical production capacity for mechanical pulp is difficult to state with accuracy, since the production depends not only upon mill equipment, but also upon undeterminable factors such as prices and the water situation. The figure chosen, therefore, is the actual production achieved in 1937, which was the best of the years in the latter part of the thirties.

There is also a capacity of about 300,000 tons sulphite and about 275,000 tons sulphate pulp for direct conversion by the mills to paper. This pulp does not reach the market except as paper.

During the War, no extension of the *total* production capacity of the Swedish pulp or paper industry can be said to have taken place. However, new bleaching plants have been installed and a number of existing bleaching departments reconstructed to take care of the increased demand for viscose pulp. One of the outstanding features of the market developments during the War has been the increased demand for viscose pulp.

Examination of the prewar Swedish pulp markets shows that the average deliveries of chemical pulp including viscose for 1936-39 were divided as follows:

	Per cent
Domestic	3
Europe excluding U.K.	27
United Kingdom	18
U.S.A.	42
Other transatlantic markets	10

These figures show the grave situation that the Swedish pulp industry was placed in by the German invasion of Norway, April 9, 1940, with the resultant blockade of the Skagerack. About 85 per cent of the industry's markets were lost including not only Britain and the U.S.A., but some of the most important European markets such as France, Holland, and Belgium. The same refers to all other transatlantic markets until the safe-conduct traffic to South America was arranged early in 1941. This traffic has been maintained with various interruptions and has permitted deliveries of pulp and paper to South America and certain other neutral countries such as Eire and Portugal.

Despite the original loss of 85 per cent of its markets, the Swedish pulp industry, producing for sale and for own use, was able to maintain production during 1940-42 at about 50 per cent of the prewar level. This was due primarily to the fact that during these years nearly one million tons of fodder cellulose were produced. Furthermore, the production of pulp for use in own mills was much less affected by the War and finally the decline in exports of paper pulp was to some extent offset by an increase in deliveries of viscose pulp to certain European markets, such as Germany, Switzerland, and Spain. The arrangement of the safe-conduct traffic referred to above also contributed to keep the mills running.

If we take all classes of pulp, including viscose and fodder, it can be said that during the War European markets have accounted for one-half of the deliveries, the domestic market for about 45 per cent and transatlantic countries for the balance. The greatly increased importance of the home market during 1940-1942 was due almost entirely to the temporary demand for fodder cellulose as a result of the War and the hard winters and bad crops of 1940-1941. However, fodder cellulose, having served the country highly in time of need, is no longer a requirement due to the greatly improved crop and farm situation. Since November, 1940, nearly one million tons of fodder cellulose, both sulphite and sulphate, have been made, which served as basic food for cattle and horses. During 1943, the need declined, but there still remained uncompleted contracts to be filled, amounting to about 150,000 tons. The quality requirements of these final amounts were changed, so that the pulp can be used for paper—if no emergency arises necessitating its use as fodder.

The increases in domestic deliveries of paper pulp for sale are quite small as shown in the following figures:

	1937	1942	1943
Chemical Paper Pulp (tons)	55,000	102,000	76,000

Quantities of pulp produced by the domestic mills for their own use were, for the same years, as follows:

	1937	1942	1943
Chemical Paper Pulp (tons)	530,000	310,000	290,000

It is believed that the increased sales of sulphate pulp for domestic consumption is due to a large extent to encouragement from the government for the production of sulphate pulp at mills having the highest output of by-products, such as turpentine and liquid

rosin. Liquid rosin is Sweden's chief raw material for soap. The output of rosin and turpentine is higher at the northern mills, using entirely northern wood of higher pitch content, than in the self-contained paper mills in the central and southern part of the country.

A small domestic market has grown up for viscose pulp. In 1937, the market was 3,000 tons; it is now about 15,000 tons.

Before the war the yearly exports of viscose pulp by the Swedish industry had reached and exceeded the 200,000 ton mark of which about one-half went to Italy. In 1940, exports of this type of pulp declined but rose again in 1941 and 1942 to slightly more than 300,000 tons. In 1943, exports sank to 165,000 tons, and in 1944 exports are likely to be additionally drastically curtailed.

During the war years the Swedish sulphite pulp industry has installed new or extended old bleaching plants and the "technical capacity" for viscose pulp now is estimated at nearly 550,000 tons as compared with 250,000 tons in 1938. A large part of these extensions, however, were not completed until 1943, when the outlets for viscose and all grades of pulp already had diminished considerably. Thus the present capacity for viscose has never been realized. Many, if not most, of the viscose mills are prepared to adapt their production between viscose and paper pulps according to the demand variations.

Until the spring of 1943, Italy was a large purchaser of Swedish viscose pulp, in fact Italy often purchased more than Germany, for Italy had no viscose sources of her own. For example, in the first few months of 1943, Italy purchased about 8½ thousand tons of bleached sulphite pulp per month and Germany about 7,000 tons per month. The collapse of Italy and the subsequent fighting there dealt a blow to the Swedish pulp industry, by cutting off about half of its viscose export market. This is reflected in the total bleached sulphite shipments for 1942 and 1943 which were about 350,000 and 200,000 tons, respectively. Shipments to Italy dropped to zero during the last half of 1943, whereas she had purchased 130,000 tons of bleached sulphite during 1942.

With the loss of the Italian market the viscose mills were forced to a slower operation, and many mills now operate intermittently at partial capacity. Germany is also buying less than formerly. For example, the amounts sold for delivery to Germany during the last half of 1943 were about 35,000 tons compared to 55,000 tons for the first half, and nearly 150,000 tons in 1942, which is less than half the amount Germany could have purchased under the trade agreement. The decrease in purchases of Swedish viscose and other pulps and paper as well, is probably due mainly to difficulties in making payment through the barter-exchange trade agreements. Increasing labor and production difficulties in Germany as well as increasing difficulties in making payments by exchange of acceptable goods, probably will keep shipments to Germany of viscose and other pulps low. The 1944 pulp export prospects for Sweden are poor indeed.

The unbleached sulphite export market is very small amounting to only 3,000-5,000 tons per month on an average. This is scattered to the continental European countries and to Argentina. Germany, which formerly purchased fair amounts, now buys none. The unbleached sulphate market is a little better, averaging somewhat less than 12,000 tons monthly. Sulphate has a larger wartime demand than other paper pulps due to the need for wrapping paper, sacks, and binding twine in Germany and occupied Europe. However, the amounts exported are but a fraction of the total Swedish kraft capacity. Like viscose, the amounts of kraft being purchased by Germany have been decreasing during recent months. During 1943, Germany purchased 43,000 tons which was 16,000 tons less than in 1942. Germany is now buying only about half her normal peacetime kraft pulp purchases from Sweden.

The mechanical pulp industry has its largest markets in Britain and France, and, ever since the Norwegian invasion, has been about 95 per cent idle. Most of Sweden's groundwood production is in the wet state and it is not expected that operations will be resumed until shipping and marketing possibilities return. The groundwood industry, unlike the chemical pulp industry is not able to change its machines over to other products or to produce valuable by-products. The idle labor of the groundwood mills has been largely employed in the forests and in the manufacture of charcoal and distillation products.

Pulp stocks are much about normal. Because normally navigation at the majority of mills is closed by ice during the winter months, Swedish stocks of chemical pulp amount by f.o.w. to about two to three months production, or about 400,000 tons. During the War, stocks have been below normal, but during the present winter, due to a shrinkage in deliveries and an improved fuel and raw material situation, the quantities in storage have increased. Many mills are operating solely to storage, and close when their magazines are full. Pulp stocks this spring are, therefore, above normal and are expected to reach 550,000 tons by the end of April.

Due to the shrinkage of the pulp market, particularly for viscose, but also including kraft, and the gradual filling of the storage magazines, the pulp industry is now operating at a low per cent of capacity. During 1942, the industry was able to maintain operation at about 50 per cent capacity, whereas during 1943 operation was about 35 per cent of capacity.

The Paper Situation

The status of the paper industry is somewhat better than that of the pulp industry, because it is based to a larger extent on domestic markets. As a result, it operated during 1942 and 1943 at about 60 per cent capacity and is now only slightly less, perhaps 5-7 per cent. Swedish paper exports are not small, being 68 per cent of the total production in 1937. In 1937, practically the full capacity of the industry was realized so that the accompanying production and export figures for that year serve as a guide.

The fine paper mills have very little export market yet have been enjoying fairly good production during the War and are now operating at more than 70 per cent capacity. The domestic markets for kraft and newsprint papers have also been steady and have even increased. These factors have helped hold paper production up to a fairly high level.

Greaseproof, on the other hand, al-

	Production in 1937	*Export in 1937*			
		Total	*England*	*U.S.A.*	*South American*
Board	135,000	70,000	37,500	.....	.....
Total (without board)	840,000	570,000	189,000	101,000	48,500
Newsprint	283,000	197,800	17,600	92,000	34,100
Kraft	224,000	189,000	78,000	10,000	.....
Sulphite	145,000	115,000	63,600	.....	.....
Greaseproof	27,500	ca. 25,000	ca. 15,000	200	.....
Fine and Misc.	160,000	43,000	15,000	.....	.....

though not a large item in Swedish production, is mainly an export item and is now rather badly off, the mills not operating over 25 per cent capacity. Sulphite papers are also a large export item in normal times and now these mills are operating at about 40 per cent capacity.

Newsprint, on the other hand, has increased its domestic market considerably, so that it is now over 100,000 tons. It also has a fair, though irregular, export market to Argentina by safe-conduct boats, when such traffic operates. The newsprint mills are operating at about 60 per cent capacity.

Kraft mills have been doing fairly well during the war for several reasons and are operating at over 80 per cent capacity. Due to an increased demand for sacks, especially for automobile charcoal and wood, the domestic market has been steady. This business, has been dropping off during the past few months, possibly in anticipation of peace. There has been a good demand during the War in Germany and some of the occupied countries for "spin paper." This is an especially tough kraft, which is cut into small strips and twisted into bindertwine for harvesting, and woven into sacks for potatoes, vegetables, grain, etc. Germany regularly buys appreciable quantities of this paper, 68,000 tons being delivered in 1943. Only scattered amounts go to other countries.

Newsprint to Argentina and kraft "spin paper" to Germany are the two principal export items now for Swedish paper. The domestic paper market is by far the most important at present.

Licenses, Sales and Prices

Pulp prices over the period just preceding the outbreak of the War in 1939, were at a low and unremunerative level. Prices touched lowest in the summer of 1939, being Kr. 100:— for kraft and Kr. 130:— for strong sulphite f.o.b. sellers mills. Business came to a complete standstill during the first weeks after hostilities began, but by the end of September arrangements made necessary by the new situation were under way about new freight and insurance rates, rates of exchange and other modifications in existing contracts as well as for fresh purchases.

Gradually shipments and business reached a volume and intensity seldom experienced in peacetime. However, shipping from the Baltic was jeopardized by German mines. Since Swedish territorial waters permitted the passage at certain places only of steamers of a certain draft, pulp was to a great extent shipped by rail or on barges and small coastal steamers to many places on the Swedish and Norwegian west coasts, from where ocean-going ships were dispatched. Prices rose and reached their top just before the Norwegian invasion in early April, 1940, when Kr. 225:— was paid for kraft and Kr. 275:— for strong sulphite per ton. Contracts closed before the outbreak of the War prevented sellers, however, from benefiting fully from the improved price situation, since the only upcharge permitted in such contracts was for extra transportation and reimbursement for the increase in production costs caused by War.

The blockade effected by the Norwegian invasion caused a disproportion between supply and demand which threatened the price structure with collapse. The situation was saved by an agreement voluntarily reached between pulp producers about minimum prices to all export markets and also a quota system for deliveries to such countries with which sales were concluded jointly. This co-operation took place under the auspices of the Swedish Cellulose Association and the Swedish Cellulose Export Association, a body organized especially to cope with the new situation. The minimum prices established in the summer of 1940 amounted to Kr. 180:— for kraft and Kr. 220:— for strong sulphite f.o.b. These prices have been increased on several occasions and present minimum quotations are Kr. 285:— and Kr. 325:— respectively.

The government took no part in the price stabilization brought about by the industry. After the outbreak of the War all grades of pulp and various other articles were placed under an embargo and no export was permitted without a license from the State Trade Commission. Since April 1, 1941, a general export embargo is in force, the State Trade Commission issuing the necessary licenses.

Swedish foreign trade has taken place under a number of bilateral trade agreements. Except for countries with currencies of international value like Switzerland, Portugal, and South America, where it has been possible to avoid the barter system.

A similar situation exists for paper export and for that matter for all export goods.

Prices for export paper are set by the various price control associations such as Scankraft, Scangreaseproof, Scansulphite, Scanfine, etc. The State Trade Commission approves and controls the quantities of paper exported. As for pulp, payments from Axis and other continental countries must be made in advance against documents of shipping for goods of equal value. In this way there can be no chance of money loss.

Export paper prices are very much higher than the prewar prices. This is due to a number of reasons, primarily to the present very high fuel costs. After the War began, domestic paper prices also started to rise. However, in 1940 the government set a ceiling price on paper and most other goods so that domestic prices have been stable since that time.

Pulpwood Supply

The War makes itself felt not only in foreign trade and production, but on down to the wood cutting program. Before the War, the total amount of wood cut yearly in Sweden amounted to about 54 million cubic meters (solid measure). In 1937, for example, the amount cut was 53.6 million cubic meters and was consumed as follows:

	Million cubic meters
Pulpwood	21.7
Lumber	18.0
Fuel and miscellaneous	13.9

During the War, the reduced operation of the pulp and sawmill industries has resulted in a considerable reduction in the amount of wood cut for these purposes. However, the consumption of wood for fuel has increased tremendously, due to the reduction in imports of coal and coke, which before the War exceeded 8 million tons per year. During the War, not even half this amount has been available. To equal this shortage, a very extensive cutting program was put into effect, which involved considerable problems in labor and transportation. Despite the difficulties, no standstills have resulted due to any lack of fuel. However, the use of wood for fuel has increased production costs.

Not only is wood the principal fuel for both industrial uses and general heating purposes, but it is also the power source for the country's autos, buses and trucks. Nearly 75,000 cars are driven by producer gas from wood and charcoal. During the War years, Sweden's industrial and domestic activity to a great extent operate on wood.

During the years 1940-1943, the total quantities of wood cut have averaged about 55 million cubic meters. For 1943, the amounts are as follows:

	Million cubic meters
Fuel and miscellaneous	28
Lumber	12
Pulpwood	13

The increased cutting of fuel wood is largely balanced by decreases for lumber and pulpwood. Most fuel wood

is cut from defective and fallen trees, thinnings, and birch. Stumps are also used. This has resulted in the cleaning up of many forest areas. Some good wood also finds its way to the fuel wood pile, especially in southern and central Sweden, where the wood at hand sometimes has to be used. However, taking the country at large the cutting program does not overbalance the growth index. The past two mild winters have lightened the burden for heating purposes.

The wood situation at the mills is good at present and ample supplies are on hand at most mills. This has been due to the importance laid to woodcutting operations and getting labor into the woods.

Technical Developments and Research

The War has given a great impetus to improvements and developments in the industry. Improved equipment, especially new bleaching systems have been installed in many mills. Improvements in purification and quality have been made throughout the whole manufacturing process. Interesting systems of sulphite waste liquor disposal as well as sulphate waste liquor evaporation have been developed. The developments in rayon and alpha pulps have been very considerable.

The need of the country for self-sufficiency during the War has resulted in striking by-product developments. Sulphite alcohol is the raw material for many chemical products, as well as for fuel and drink. The sulphite pulp industry is now supporting a growing organic chemical industry producing glycol products, acetaldehyde, acetic acid, butanol, ethylene dichloride, butyl acetate, ethyl acetate, thiokol and other materials. Also cymol is recovered from the relief gases and converted to toluol and other chemicals.

The sulphate pulp by-products include turpentine, resins, soap, and cracked oils for various purposes.

A small cellulose derivative industry has also started, and a number of products are being made on a small scale, including lacquer products and water soluble products for adhesives and for giving body to certain food products.

The industry is preparing for peace and the future by an active research program into new products and improvements in present products. Large, excellently equipped research institutions have been built by several companies and others are under construction. These have both technical and fundamental research apparatus and pilot plant equipment and good staffs of scientists and technical men.

A fine, modern, well-equipped institute for wood research is planned for Stockholm. This will be supported by the pulp and paper industry, the wallboard industry, plywood manufacturers, the wood exporters association and the Swedish government. This will be a central research laboratory for the industry and construction is planned for this year. The institute will be equipped with fundamental research rooms, analytical sections, a paper machine 75 cm. wide, pulping apparatus, etc.

◆

Preparing the Paper Industry for Peace

(Continued from page 300)

comprise it. While industries compete in services and products, their essential competition lies in manpower. Too often young men are drawn to an industry by propinquity or casual contact. Progressive industries will recognize that they cannot be content with such promiscuity and, through collective action, they will seek and train at least their share of outstanding men, no matter where they live or what their previous interests have been. In this way the foundations are truly laid for a vigorous and enterprising future. Here will be found the plasma that is necessary for healthy survival.

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Barking Pulpwood . . .

(Continued from page 302)

sary axe cuts and knot boring, will be approximately the same at each installation — it has been determined at from 10 to 15 per cent at least where hydraulic barkers have been in use — but saving due to the greater cleanliness of the logs cannot easily be estimated.

The Streambarker produces cleaner wood for pulp than do older type barkers because there is no tendency to imbed cinders and other impurities in the wood during the barking process, because dry rot is eliminated while wood is in the barker, because the machine washes while it removes the bark, and because the bark around branch stumps comes off easily under the high pressure jets of water.

Because the Streambarker does produce cleaner wood, rossing and other hand labor and equipment necessary for final cleaning in older methods of barking are not necessary.

Less direct advantages include the fact that chipper knives remain sharp longer with cleaner wood, cleaner wood saves chemicals in cooking and saves time and equipment for cleaning pulp for papermaking, and because the logs are in water but a brief time in the barking process the bark does not have time to become hydrated to any extent and therefore bark removed by the Streambarker does not contain as much free water as does that removed in older wet-barking methods.

The original Allis-Chalmers barker has been in continuous operation since February, 1943, and has given satisfactory results on almost all kinds of wood. Four more barkers of a later design have since been put into service, and to date these have been running satisfactorily. The company has seven more machines on order and in process of manufacture.

The Allis-Chalmers Streambarker is not in competition with the gigantic hydraulic barkers developed by West coast pulp mills for their own use in barking the huge trees of that region. Those machines, which have been specially constructed for the individual needs of each plant and which, consequently, are built as a part of the plant proper, are practical only for handling huge logs, some of which measure six feet in diameter and 26 feet in length.

The Streambarker, which was developed to handle the smaller pulpwood sticks in a practical manner, is simpler, more compact, and easily moved from one location to another in the same plant, if necessary, or to other mills of a corporation.

However, both the oversize machines and the Streambarker prove the value of hydraulic barking methods. The huge barker evolved at one West coast mill enables them to make a ton of sulphite pulp out of an average of 790 board feet of lumber where formerly 1,032 board feet were needed. As the machine is installed in a 275 ton mill, this means a saving of about 66,000 board feet per eight-hour day. A Streambarker installed in an East coast mill gives a comparably favorable percentage of saving in pulp from the smaller logs.

The 100 ton eastern mill is served by just one Streambarker, and if the machine were taken away, the mill would have to shut down. Because of the shortage of manpower in the lumbering regions during the present war emergency, the Streambarker is seen as a lifesaver for a number of mills which will otherwise have to shut down because of their inability to obtain hand-barked logs from the forests as they have been doing, and because they have no other log barking facilities at present.

Higher Paper Machine Speeds and the War Effort

ROSCOE H. SMITH
Manager of Applied Engineering
The Reliance Electric & Engineering Company

▸▸▸ FAR-SIGHTED MILL MANAGEMENT has regularly based specifications for new machinery and its driving equipment on speeds somewhat beyond those known to be attainable at the time. For example, a newsprint mill making paper at 1,000 fpm on its fastest machine may, in going ahead with plans for new equipment, engineer for 1,500 fpm, even though the top speed of other newsprint mills at the time is not over 1,300 fpm. Or, a manufacturer of book papers with not a single machine running over 350 fpm and no one in the industry producing above 550 fpm, may specify a new machine for its grade of papers with a electric drive capable of running at 800 fpm.

In some cases, the full available top speeds at which motors will drive their machines are not realized for long periods of time. In other cases, developments take place rapidly which (1) improve the ability to form the sheet at a higher rate of flow over the wire, (2) increase the water removal rate by the boxes and suction rolls, or (3) step up the driving capacity of the dryer section, and permit the various basis weights to be run at higher speeds respectively. Improvements of this nature have been known to absorb very quickly the full available reserve of higher speed previously provided in the drive equipment.

The War, with its limitations and restrictions on consumption of pulp, and in some localities on power, has brought other influences into play. The production of lower basis weight sheets is in the direction of supplying printers with the quantity of paper they need, at the same time decreasing the consumption of pulp and other restricted ingredients. To accomplish this without an increase of speed on the paper machine, as in those mills where no reserve of higher speeds remains, is costly because machine output and tonnage are reduced, cutting down the dollar "take-in" with no cutback in labor and operating time on the machine. The lower income resulting is only partially compensated for by the reduction in materials which is effected.

By maintaining full tonnage per machine and even increasing tonnage where other developments have made that possible, the operation of certain machines at higher speeds makes it feasible to shut down other machines altogether. Labor and machine operating costs are thereby kept in line with income; the drain on manpower is less of a problem; and for companies having mills in more than one locality, operations in a mill in a critical power area can be temporarily stopped, and manufacture concentrated in mills located where no war plant demand for power exists, or which have their own power generating systems.

In 1939, a large paper company contemplating plans for a complete new machine was confronted with the question: Should it spend money for larger driving equipment capable of rotating the rolls of the several machine sections at speeds greater than those at which the company already was definitely sure it could produce papers of the grades to be made? Paper of these grades was not being run on the company's existing machines, even as fast as 600 fpm. Advances in the art, machinery improvements, and better regulating electric drives, which had come along since the existing machines had been installed, made higher speeds appear obviously possible. There was no clear answer, however, to the question, "how much higher"? Machine rolls, and dryers capable of revolutions per minute corresponding to speeds of 1,200 to 1,400 fpm (and even higher) were known to be no myths in manufacturing entirely different grades of paper. Drives were running those machines with good regulation and well controlled "draws."

A careful analysis of all the facts satisfied the company's engineers that its papers could be made at speeds

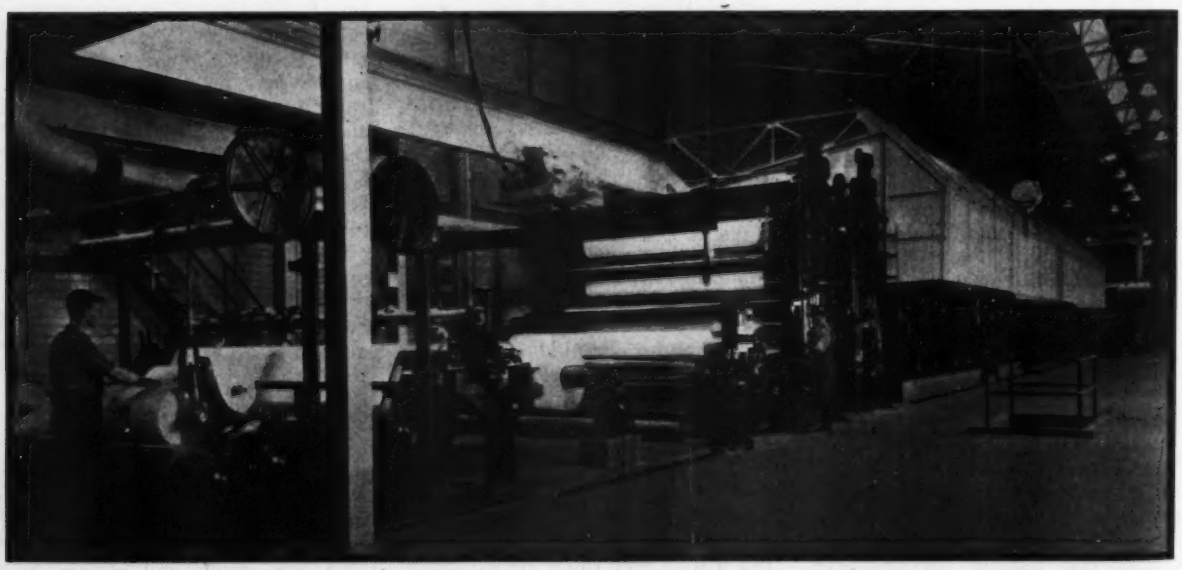


Fig. 1—High grade book papers are made on this modern paper machine equipped with complete Reliance sectional electric drive, using the Harland System. Machine and drive were both engineered to operate at speeds nearly twice the practice current at the time for machines producing paper of equivalent grade.

above 600 fpm, with reasonably good chances of reaching 700 fpm; and, further, that still higher speeds were probably only a matter of time and of developing those minor refinements which experience in working up to higher speeds would bring.

Estimates on the use of a Reliance sectional electric drive with Harland System of "interlock" section motors were prepared for different maximum speeds and the costs compared. To facilitate the analysis a complete new drive to provide 1,000 fpm was laid out on paper alongside a drive for 750 fpm. Section by section, the individual motor, gear reducer, magnetic contactor panel, and auxiliary items were listed. For the over-all machine, the generators and exciter of the variable voltage set and the synchronous motors required to drive them were listed with corresponding main generator and motor starting panels. It was found that the difference in cost of the drive for 1,000 fpm over that of the drive for 750 fpm was a considerable amount; too much, in fact, to expend in advance for something to be realized at an uncertain future time.

An alternative, a variable voltage system of paper machine drive where different linear speeds are obtained by corresponding different voltages which the generator is adjusted to impose on the section motors, was then studied. In engineering such a drive, various base speeds and design voltages are available from which to select an operating voltage which is to produce a given machine speed in feet per minute, and gears can be selected to suit. Each machine section is provided with a motor selected to meet the maximum running torque requirements of the section and to be capable of developing that torque as a constant torque requirement over a specified linear speed range of the machine.

In this system, where voltage is proportional to speed, the armature drawn by a section motor is proportional to the torque it is called upon to develop. Consequently, over the specified speed range, the current drawn by the motor does not change so long as the torque requirement is constant. Voltages conventionally used in such a selection are 230, 250, 300, 460 and 500 volts; any one of these being selected as the voltage at which maximum speed can be obtained. The use of the higher voltages, 460 and 500 volts, has been quite general outside of the United States, but although successfully applied to several machines in this country, the majority of electric drives here are based on the lower voltages. In this particular case, the mill engineers did not wish to depart from a company policy of using 230 or 250 volts for d-c. drives.

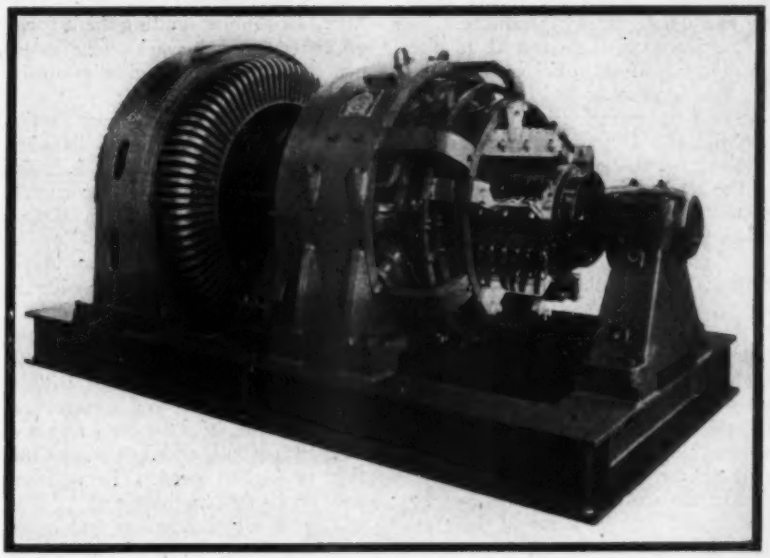


Fig. 2—This motor generator set, designed with an extra-long commutator for low voltage operation, is connected directly in the circuit of the main variable voltage generator to provide the increased range of paper machine speeds. It handles the full current of the complete paper machine drive.

For two different maximum speed requirements, the consideration of the same system voltage and the same motor speeds for both involved selecting higher ratio gears in the reducers for the lower speed requirement than for the higher speed requirement. This meant the use of smaller motors, because the running torque requirement of a particular section, when obtained by higher ratio gears giving the motor a greater mechanical advantage, calls for less torque at the motor shaft and consequently the motor draws lower armature current. However, by using a proportionally lower voltage for the lower maximum speed requirement and correspondingly lower motor speeds, lower gear ratios and motors which will develop the same torque and draw the same armature current as involved in the higher machine speeds could be considered.

By careful analysis of available motor designs and the use of effective motor ventilation from an air supply commonly used in sectional electric drives, a selection of motors and reducers was made which would be identical for both the 750 fpm and the 1,000 fpm requirements. The increase in motor cost in this combination over the cost of the motors in the original 750 fpm drive was partially offset by lower ratio gear reducers of the same torque output. Many items on the magnetic contactor panel for the section motors and the auxiliary section interlock regulators and draw controls are the same, irrespective of the size of the motors, so they introduced no difference in cost.

A starting and accelerating system was considered in which only one continuous duty contactor and one intermittent duty contactor per section motor were involved. Magnetic contactor sizes do not vary with every step in motor size, but come in ratings of 100 amperes, 150 amperes, 300 amperes and 600 amperes. In the case of several sections, the contactors for the larger motors to provide 750 fpm on lower voltage still came within the same ratings as for the motors in the original 750 fpm drive layout.

The motor-generator set for the variable voltage system, however, involved a somewhat different consideration. Its speed was fixed by the alternating current frequency of the mill regardless of paper machine speed. Consequently, in kilowatt rating, as also horsepower rating of its synchronous motor, any combination of voltage and paper machine speed still made the size of the variable voltage set for 1,000 fpm operation larger by 33⅓ per cent than for a set for 750 fpm operation, and the synchronous motor starting panel was affected accordingly. The variable voltage set, therefore, and its synchronous motor equipment for an arrangement to provide 1,000 fpm, involved a real item of additional investment over that required for a 750 fpm drive. This difference in investment could be justified several times over, once operation of the paper machine at speeds from 750 to 1,000 fpm could be realized. Until that time was reached, however,

the additional investment would stand out as a questionable expenditure.

Consideration then turned to the possible use of an auxiliary low voltage generator set as had been done in speeding up several drives in Canada and the U.S.A. some years after the original installations. The generator of the set had in each case been connected into the main circuit of the existing variable voltage generator of the drive, resulting in an increased voltage being applied to the section motor.

For the same running torque requirement of the machine section, the higher armature voltages produced proportionally higher motor speeds, thereby had increased machine speeds without increasing the armature current delivered by the original generator or the armature current drawn by the several section motors of the Harland System.

Applying the same engineering to the present problem, a generator design was selected and with it a variable voltage set which would be only as large as required by the new machine for operation up to a maximum of 750 fpm. This meant limiting the capacity of generator and synchronous motor equipment to that originally considered for 750 fpm.

Future requirements were anticipated by determining the auxiliary low voltage generator set and accessory equipment to be added to the drive at such time as operations above 750 fpm were satisfactorily assured. Adopting this plan, the company proceeded in 1939 with a contract to provide its new machine with a sectional electric drive in which all parts initially supplied for a maximum speed of 750 fpm would likewise be used without alteration when the low voltage generator set and its accessory equipment were subsequently added to attain 1,000 fpm or higher speed. The performance of the new machine with its drive was up to all expectations and it was not long before the speed at which the paper was being made had practically reached the limitation of 750 fpm initially imposed on the installation.

A few trial runs were therefore made at the maximum speed obtainable with the drive "as was." By making short-time adjustments and working to the full limits of the regulating systems, speeds exceeding 800 fpm were obtained and the technique perfected whereby the machine could produce the desired paper in this high range of speeds. The decision to proceed with the booster generator set followed, the necessary equipment was subsequently installed and has now been in service several months.

When heavy grades of paper are being made in the lower range of machine speeds, it is not necessary to use the booster generator set and only the original drive equipment is employed. Today, however, advantage is being taken of the higher speeds available to secure an increased output of paper with the same machine and operating crew. Speeds are being stepped up for lighter basic weights to get the maximum surface of printing papers from the available pulp and material delivered to the machine. The restrictions on pulp are being applied at another mill where power is limited and where the drain on men is heavier because of the demand of large war plants in close proximity.

The machine which has been so successfully speeded up is the fourdrinier type, designed to produce book papers from 30 lb. to 55 lb. basic weight. It consists of 13 driven sections from the couch to the reel inclusive with various auxiliary drives, totalling 19 electric motors operating in conjunction with a 300-kw. main variable voltage generator set, supplemented by a 75-kw. booster set. The Reliance-Harland System of section electric drive includes mechanical differential interlock section regulators synchronized by small synchronous motors, all operating from a master alternator. Accurate draw control is provided through small pilot cone pulleys on the interlock regulators with provision for setting the positions of the pilot draw control belts by remote control from the front of the machine. Dual-motor sections, such as the dual press and the main dryer section having two in-drive shafts, are provided with motors having specially designed drooping speed characteristics. This makes it possible for adjustment of the load division on the part of the operators at controls at the front of the respective sections where load indicating ammeters and load dividing rheostats are provided. The reel motor has a drooping speed characteristic and inherently synchronizes the reel with the machine without interlock regulation by its natural response to tension adjustment as made by the operator at the reel where he is provided with an ammeter and rheostat for the purpose.

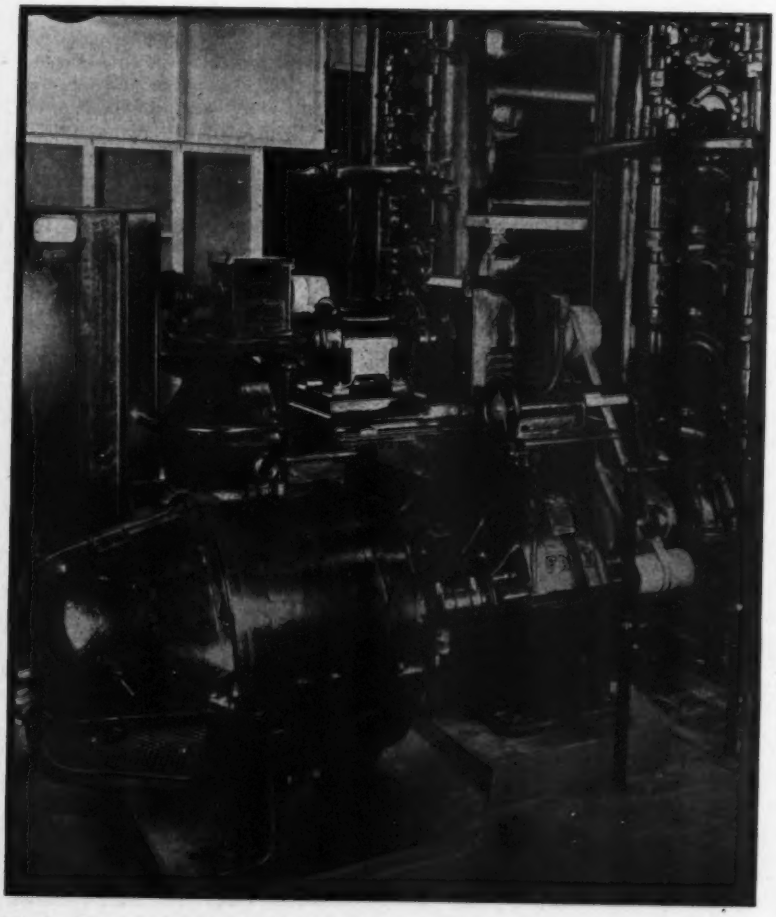


Fig. 3—Close-up of section interlock regulator and draw control of the Harland System shown mounted on reducer. The main drive motor of the calender section is in the immediate foreground.

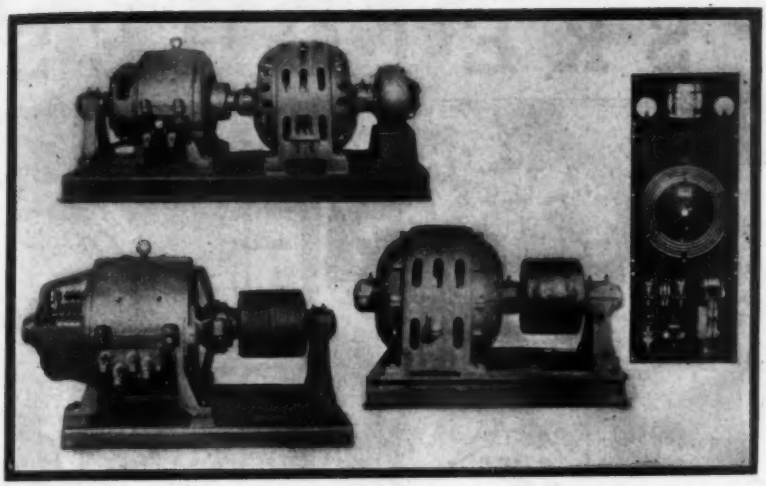


Fig. 4—Equipment for single-motor drive supplied for a 164-inch book machine to provide a speed range of 125 to 500 fpm includes: (1) variable voltage M-G set, (2) variable speed motor for machine, (3) constant speed motor for pumps, and (4) magnetic panel for variable speed of machine. Subsequently an additional generator has been installed in series with this generator—and an individual motor has been applied to the machine section to raise the available speed range to 125-800 fpm.

It has been frequent practice in supplying some drives to paper machines to use a system in which the frequency in the master alternator circuit supplying small motors on section regulators is held proportional to the voltage of the main generator. Since the frequency and speed of the synchronous motors are the speed reference for the section motors to which they are connected through one form or another of responding device, the voltages on which section motors operate are directly proportional to the machine linear speed. Since the motor speeds over a range of variable voltage control are not directly proportional to armature voltage without alteration of the shunt field strength, the shunt fields of the motors have to be automatically adjusted to whatever field weakening is required to compensate for this condition of regulation.

In the Reliance-Harland System the drives are engineered with the definite objective of maintaining the shunt field strength of the section motors at the same value over the linear speed range of the machine and the generator voltages are purposely not regulated exactly in proportion to linear speeds, but instead to whatever values produce interlocked speed relationship of the motors without appreciable deviation of motor shunt field strength from the established value. In this way the motor torque per ampere remains constant and the motors perform in the most ideal part of their shunt field curve.

Use of this system in the drive for the machines described above simplified materially the problem of introducing the auxiliary low voltage generator directly in the circuit of the main variable-voltage generator in providing an increased range of operating machine speed. No complexity of automatic voltage regulation had to be taken into consideration.

Listed herewith are paper machines equipped with sectional electric drives of the Reliance-Harland System which have been increased in speed, the majority of them by installing low-voltage booster generators.

Description	Original Speed (fpm)	Increased Max. Speed (fpm)
92″ Tissue and Book Machine	400	600
138″ Book Machine	750	1,000
148″ Crepe & Spec. Machine	450	675
164″ Book Machine	500	800
168″ Kraft Machine	800	1,000
226″ News Machine	1,000	1,400
234″ News Machine	1,000	1,100
226″ News Machine	1,100	1,400
234″ News Machine	1,200	1,300

Vested Patents . . .

(Continued from page 305)

Journal für makromolekulare Chemie (about 3 volumes per year) $6.00 (per volume).

Kunststoffe, $15.00.

Kolloid-Zeitschrift (about 3 volumes per year) $8.00 (per volume).

Designs and Trademarks

About 300 design patents and a large number of trademarks are vested in the Alien Property Custodian. They are not so important to the war effort as are the patents of invention and the copyrights of technical books and periodicals. Some of them, however, have a great deal of commercial significance. Design patents and trademarks belonging to vested corporations are not separately vested and therefore are not licensable excepting by agreement with the corporation. Information about vested design patents and trademarks can be had from the Alien Property Custodian, Washington 25, D. C.

How to Obtain Greater Efficiency and Make Chipper Knives Last Longer

Failure	Cause	Correction
Gaps on cutting edge	Cutting edge weak	Use a segmental or cup type wheel to produce flat, straight bevels. If grinding is done with a periphery type wheel, select one of as large a diameter as possible to avoid extreme concave bevel.
	Incorrect bevels	Grind the bevel to suit chipper condition. If possible a 36° top bevel and 20° to 25° back bevel. When timber is frozen, a 40° top bevel is recommended. Hone after grinding to remove all trace of fash. If edge continues to gap or break out it may be necessary to shorten the bevel.
Poorly cut chips and excessive wood dust	Dull cutting edge	Sharpen carefully as recommended
	Incorrect bevels	Use recommended bevels
Cracks on cutting edge	Overheating in grinding	Use a soft, fine grain grinding wheel with plenty of coolant. Check speed and feed of grinding wheel. Keep grinding wheel well opened.
	Overheating in use	Keep knives sharp and grind carefully with correct bevel as recommended.

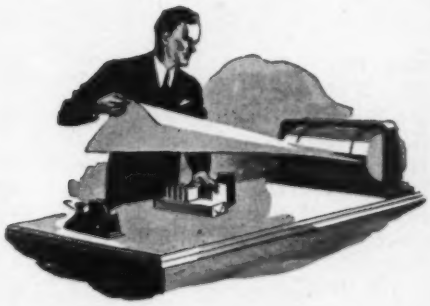
—Henry Disston & Sons, Inc.

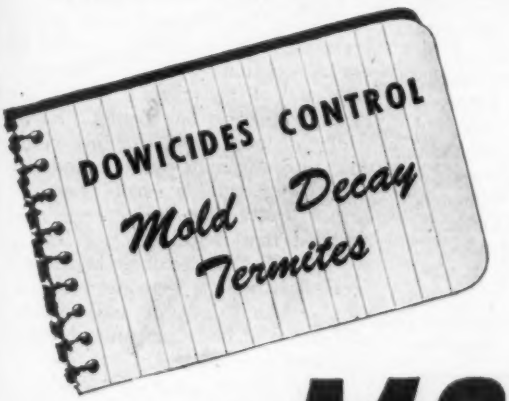
PAPER SKETCHES

WITH THE DEVELOPMENT OF PRINTING IN THE 15th CENTURY, THE PRACTICE OF MAKING SOLID WOODEN BOOK COVERS WAS DISCONTINUED IN FAVOR OF PASTEBOARD COVERS - OFTEN MADE BY PASTING TOGETHER LAYERS OF WASTEPAPER.
IN THE 18th CENTURY, SCREENS OF FINE WHITE PAPER WERE USED TO DIFFUSE CANDLE- AND LAMP-LIGHT.
WASTE PAPER
IS AT PRESENT THE NO. 1 CRITICAL WAR MATERIAL OF THE UNITED STATES.
IN ANCIENT ROME, PAPER MANUSCRIPTS WHICH DIDN'T SELL WERE USUALLY DISPOSED OF TO FISH MONGERS AND OTHER RETAILERS WHO USED THEM TO WRAP UP THEIR WARES.

CANCEL YOUR INVITATION TO MOLD!

Take the proper steps now—cancel your invitation to mold and all of its destruction—with Dowicide. There are seventeen related products whose chief function is to help you defeat the scourge of mold bacteria and insects in your business. Backed by years of research and increasing industrial acceptance, the Dowicides are ready to help you with a definite control.





To produce constant strength, high quality paper, every operation from the pulp stage on through to final product must be constantly guarded against mold attack. Dowicides added to the stock chest prevent "souring" of pulp. So, too, lap stock in storage can be protected from mold stain.

Special mold resistant papers, such as soap wrappers, can be dependably produced by the addition of Dowicides during manufacture. Even the adhesives used in various operations can be moldproofed.

The simplicity of the methods of applying Dowicides to paper makes it an operation that any manufacturer can perform with economy.

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New York • Boston • Philadelphia • Washington • Cleveland
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Among the many Dow products serving the Paper Industry are: Methocel, Ethocel and Caustic Soda.

DOW

Silver Anniversary of
The Superintendents Association

▶▶▶ ON ITS TWENTY-FIFTH ANNIVERSAY The American Pulp and Paper Mill Superintendents Association met at the Edgewater Beach Hotel, on the shore of Lake Michigan, in Chicago. This annual gathering, held May 24 through the 26th, was the Association's Second Wartime Conference.

The attendance did not break Association records, but approximately 626 delegates were registered. Figuring the absentees in service and in Government work, and those who could not be spared from their jobs even for a few days, this seemed very representative for wartime. Twenty-one members of the Association are in the Armed Forces. An interesting highlight of the meeting was that of the 17 living past presidents of the Association, ten were registered at the meeting.

Each of the delegates registered for the Convention received a de luxe booklet "The Silver Years," which contained a brief history of the Association, a list of its divisions and past presidents, and other pertinent information.

Early in the life of the Association, the keystone reproduced on this page was chosen as an emblem. The aims and purposes of the Association have been preserved *in toto* throughout the past quarter of a century, and the accomplishments of the organization prove that its leaders have never wavered from that early perspective.

The leaders of the Association have watched its progress much as a parent watches a child. They have seen it ride the wave of a prosperous sea; they watched it wade through the mire of a depression, and now having reached its majority and turned over four leaves of a new volume, this organization is writing production history—on the home front—in the greatest war of all time; chin up, with a grim determination to help keep the paper industry producing throughout the great conflict and to lay the groundwork for the new era which will follow Victory.

Preliminary to the opening of the Conference on Wednesday were the Board of Trustees meeting the morning of the 23rd and the Affiliates' dinner that evening.

The first session of the Convention opened Wednesday morning, the 24th, at 9:30 in the East Lounge, President Stanford G. Blankinship presiding. The first part of the opening session was highly impressive. The invocation was given by the Rev. Benjamin M. Will, Pastor, Country Church of the City, Chicago, which was immediately followed by Robert L. Eminger, national secretary-treasurer, who read the Necrology. The names of those members added to the roll during the past year are: William Edmonds, Charles L. Ellis, Emil C. Gildenzopf, Charles H. Kephart, Harold W. Knight, William C. Nash, F. W. Royse, George W. Sterrett, Herman C. Zielsdorf, and Arthur Zimmerman.

At the opening session, President Blankinship read his message to the Association. Following is the President's message for 1944:

Stanford G. Blankinship, retiring president of the Association.

Emblem of the American Pulp and Paper Mill Superintendents Association.

The President's Message

It is my special previlige to call to order the Twenty-fifth Convention of our Association—our Silver Anniversary, and at this time I would like to pay tribute to one Fred C. Boyce, daddy of our group, for his vision and understanding of the industry when he called his small group together twenty-five years ago and founded this Association. I believe we have lived up to their hopes and ideals because today our members cover these United States and Canada, and our Affiliated Companies number well over one hundred.

When you honored me by making me one of your vice presidents, little did I think that my term of office as president would fall in a horrible war year; nevertheless, we have carried on as an Association and grown both in membership and in the number of Affiliated Companies, co-operating always with the war effort in our programs and projects.

In looking to the future of our Association, and may I say, not only the distant future, but the immediate future, we have several matters which I believe demand our wholehearted support. First, needless to say, an all-out effort on our part, both as individuals and as a group, will help to bring this War to an early conclusion. To my mind, our next number one job should be Labor Relations. Who, better than our Group, is qualified in our Industry to take over this responsi-

The Mark of Craftsmanship . .

For well over sixty years the Bagley and Sewall Company has been devoted almost exclusively to meeting the demands of the paper industry. During this period great developments have taken place in the progress of engineering as well as manufacturing.

Today a Bagley and Sewall paper machine or any of its auxiliary equipment is a highly developed product, modern in every sense, and designed to give efficient and maximum production. It is the result of constant engineering research and complete manufacturing facilities.

Inherent in the building of any piece of Bagley and Sewall equipment is the element of craftsmanship; the work of skilled and experienced men.

The plaque you find on a Bagley and Sewall machine is truly *"The Mark of Craftsmanship."*

BAGLEY B&S SEWALL

THE BAGLEY & SEWALL CO.

WATERTOWN, NEW YORK

Builders of Paper Machines and Paper Making Equipment

bility, and it is a growing responsibility. Our Labor Committee has much work ahead of it, particularly regarding postwar problems.

Following Labor Relations, our project work should be carried on as an important part of our yearly program. This project work should be in conjunction with our Affiliates, and in using the word "conjunction," I mean that both the members of the Superintendents Association and the Affiliated Group should work very closely together in making this project work a common problem to both groups for the good of the Industry as a whole.

Our group meetings have now been set up with a so-called revolving committee consisting of three members from the Superintendents Association, and one member from the Affiliates acting as vice-chairman. This method will tend to make the work more permanent, as two men in the group will carry over each year into the following year, and in this way will always be able to complete any unfinished programs.

My own experience in the Association prompts me to mention one other matter which I believe will tend to give us great strength as a group over a period of years and that is the lasting friendships which are made year after year. It has been my privilege both as a member and as an officer of this Association to have made many new and sincere friends. There are so many possibilities that lie ahead of us as a group that I know with some vision we can accomplish a tremendous amount of good in our field, the pulp and paper industry.

In closing, I wish to thank you for the honor of having been your president and want to leave with you this thought, "Where there is no vision, the people perish."* Let us apply that thought to our Group and continue to grow and prosper.

Raymond L. Barton, newly elected president of the American Pulp and Paper Mill Superintendents Association.

▶▶▶ The second part of the Wednesday morning session drew a good hearing for the panel discussion on "The Utilization of Less Desirable Species of Woods in the Making of Pulp," with President Blankinship as co-ordinator. The panel was composed of:

M. W. Bray (Kraft)
J. N. McGovern (Sulphite)
Earl Schafer (Groundwood)

all of the Forest Products Laboratory, Madison, Wisconsin, and

G. H. McGregor, Swenson Evaporator Co., Div. of Whiting Corp., Harvey, Ill.

H. P. Baldwin, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.

Following the reading of prepared papers by members of the panel, a number of questions from the floor evoked earnest discussion.

Mr. Bray brought out a very interesting point regarding the shortage of kraft. He pointed out that most of the kraft containers used for war purposes are shipped out of this country which takes a heavy tonnage of kraft fibers off the market. This also throws a greater burden on sulphite pulp which must supplement the kraft.

Several expedients were applied to sulphite by Mr. McGregor, among which were the use of less desirable species, the use of various wood wastes, and a higher percentage of yield.

The last subject presented at the first General Conference session of the Association was "The Chicago Plan of Waste Paper Salvage." The speaker, John R. Robinson, has for a number of years been connected with the paper industry; he has also been a newspaper man. At present, he is chairman of the publicity and salvage committee of the Chicago Plan for Waste Paper Salvage of the Chicago Newspaper

(*) Proverbs 29, 18.

The Board of Trustees of the Association held a meeting at the Edgewater Beach Hotel in the forenoon of the day preceding the opening of the Convention.

TELESCOPING TIME

War has created coloring problems on both old products and new specialties—problems arising from shortages and limitations.

During this period it should be mutually helpful for us to work together. Our laboratories can help you solve your wartime technical problems. We may, in addition, telescope time by accumulating vital experience and knowledge that will bring profitable solutions to post-war problems. E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Dyestuffs Division, Wilmington, Delaware.

Du Pont Dyestuffs

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

DU PONT DYESTUFFS

The Luncheon Meeting on Wednesday was held in the beautiful Marine Dining Room of the Hotel. Elmer T. Stevens (shown at the extreme left) was the guest speaker. Mr. Stevens is president of Charles A. Stevens & Company, Chicago; he is also Trustee of the C. E. D. Dwight Stocker (president Michigan Paper Company), shown at far right, was the toastmaster.

Publishers Association. Mr. Robinson outlined the work that is being carried on in Chicago to generate a heavy tonnage of wastepaper every month. He is giving all of his time to this work which has the support of city officials and the Chicago Board of Education. The board mills of the midwest were commended for their splendid co-operation in supporting the wastepaper salvage program.

Wednesday Luncheon

The beautiful Marine Dining Room of the Hotel accommodated the luncheon meetings on both Wednesday and Friday. At the Wednesday luncheon, Dwight Stocker, president of the Michigan Paper Company, Plainwell, Michigan, was toastmaster. Appropriate organ music was played preceding and during the luncheon. The guest speaker for that meeting was Elmer T. Stevens, president, Charles A. Stevens & Company, Chicago. Mr. Stevens is trustee of the Committee for Economic Development, and he spoke on the organization and work of the C.E.D. In explaining the reason for this organization, Mr. Stevens said it was formed because Government and business leaders agreed that America's postwar reconversion problems were so urgent and no present business organization was equipped to do them justice. At the present time, nearly 40,000 business men are engaged in this work. The speaker emphasized that the concern of the C.E.D. for the postwar period is employment, but more than that, *productive* employment. He likened the business men of today to "the minute men of 1776," and said they are as much needed now as they were then.

Mr. Stevens illustrated his address with cardboard forms simulating columns. Comparative statistics had been made up for the year 1939, 1943, and 194X (the year after Victory). The scale showed comparative employment data, using figures taken from the records of Williamsport, Pennsylvania, which had been chosen as a typical American town. One column scaled the number of inhabitants for the given years, another showed the number of men employees, still another the number of women employees.

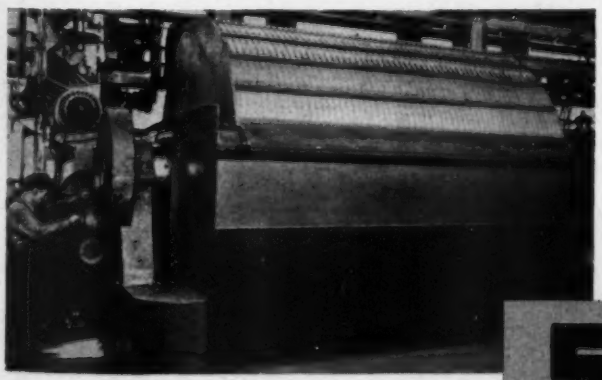
▶▶▶ The first paper presented at the General Session on Wednesday afternoon was on the subject of "Re-employment of War Veterans." It was given by Lawrence J. Fenlon, who is chairman of the National Employment Commission of the American Legion, Chicago.

The speaker said, quite emphatically, that industry *must* provide jobs for returning soldiers, both able and disabled. He pointed to industry's legal obligation to veterans and also referred to legislation which has been passed by the House (H.R. 4115). This measure would give war veterans preference in appointments to federal service.

Since Robert L. Eminger became a national officer of The American Pulp and Paper Mill Superintendents Association, he has not missed an annual meeting. The Association's Silver Anniversary was the twentieth meeting he had attended. Mrs. Eminger has missed only one meeting in that time.

THE SWENSON-NYMAN PULP WASHER

Installations now in use show that a single Swenson-Nyman Pulp Washer can successfully replace two (and sometimes three) ordinary drums in kraft and soda pulp mills. Features include two-stage washing on a single drum . . . washing area twice as large as the sheet-forming area . . . independently controlled vacuum on each stage . . . strong and weak liquors handled separately. Backwashing is entirely eliminated . . . and pickup and sheet formation are uniform even with very hard and free pulps.



One of several Swenson-Nyman installations . . . now in operation and providing higher pulp washing efficiency.

PLAN REPLACEMENTS AND IMPROVEMENTS NOW

Swenson engineers have long contributed to higher efficiency in pulp mill operation. They are prepared to help solve any of your problems connected with the following:

Pulp Washers . . . Black Liquor Evaporators Digester Blow Condenser Heat Recovery Systems . . . Lime Sludge Filters . . . Causticizers

SWENSON

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W. W. Galloway, of Bauer Brothers (at left), greets two past presidents of the Association: Wm. H. Brydges (center), vice president of Bedford Pulp and Paper Co., and Grover Keeth, of Marathon Paper Mills Co.

A highly interesting and valuable treatment of the subject of "Suggestion Systems" was given by F. A. Denz at the Wednesday afternoon session. Mr. Denz is general chairman of the United Air Lines, Transport Corporation Employees Suggestion Conference, Chicago. The speaker stated that the use of suggestion systems has increased since we have been at war. Large charts had been set up to show how some of these systems are applied.

The "Functioning of Labor-Management Committees," in the plants of E. I. du Pont de Nemours & Company, particularly the Grasselli Chemicals Department, East Chicago, Indiana, was explained by H. M. Gryllis, chairman of the Labor-Management Committee at the Grasselli plant. This was the last feature on the program for the Wednesday afternoon session.

Group Meetings and Postwar Planning

The second day of the convention found the superintendents confronted with a full schedule. During the morning five group meetings were held. The groups and their chairmen were:

Chemical Pulp—Niles M. Anderson

Tissue—F. X. Kreiling

Finishing, Storing and Shipping—Raymond L. Barton

Power and Plant Engineers—Raymond F. Bennett

Woodroom and Woods Operations—H. F. Hackworthy

On Thursday afternoon a general session took up the subject of "Postwar Planning." This session was conducted as an open forum, with Dr. Walter Hoffman, superintendent of manufacturing, Fitchburg Paper Company, as co-ordinator. The discussion was led by a panel of nine members of the Association, and was based on the results of a questionnaire which had been sent to the Industrial Affiliate Companies for information on developments being made by them. Last year, President Blankinship appointed a committee chosen from the Affiliates to prepare this questionnaire on Postwar Planning. Dr. Hoffman was chairman; the members were: T. E. Dial, R. W. Hynes, S. W. Fletcher, N. M. Anderson, Glen Sutton, also G. W. Craigie, Association Field Secretary and S. G. Blankinship, ex-officio. There had been a very substantial response to the questionnaire and a list of the returns had been prepared and was distributed at the session. A large number attended this forum which lasted well through the afternoon.

A business meeting for the Association members was called which closed the agenda for the day. At this meeting committee reports were rendered, officers elected, and resolutions presented. The Resolutions Committee was composed of: Harry E. Weston, chairman; Killey E. Terry, and Homer H. Latimer.

The following slate of new officers was passed by the members at this meeting:

New Officers

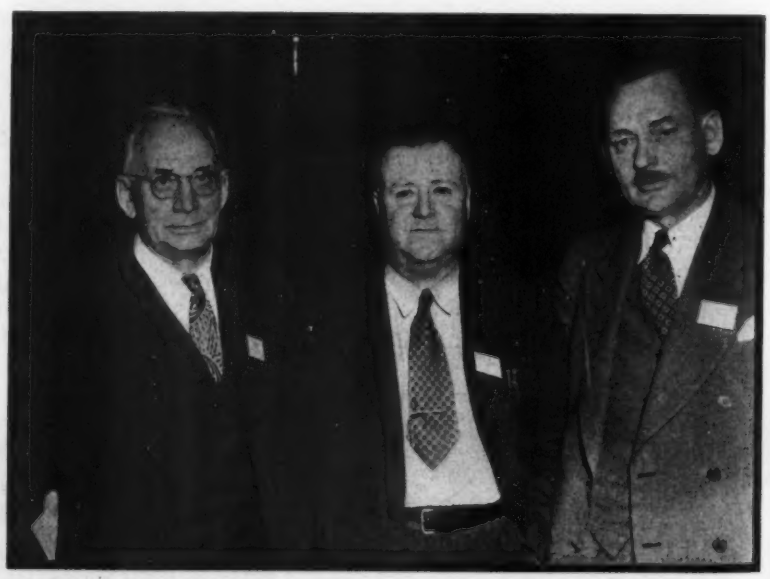
President — Raymond L. Barton, Michigan Paper Company.

First Vice President—Niles M. Anderson, Marathon Paper Mills Company, Ltd. (Toronto)

Second Vice President—Homer H. Latimer, Champion Paper & Fibre Company.

Third Vice President—Raymond F. Bennett, Ecusta Paper Corp.

Fourth Vice President—Ollie W. Messner, Robertson Paper Box Company, Inc.



Three friends caught talking together just after the Wednesday luncheon. Left to Right: Fred C. Boyce, first president of the Association; M. L. Peterson, D. J. Murray Manufacturing Co.; and W. J. Fahrenkrug, Badger Paper Mills, Inc.

New Stein-Hall Process

FOR FIBER CONSERVATION

(Patent No. 2,207,555)

1. *CLARIFIES WHITE WATER.*
2. *IMPROVES OPERATION OF SAVE-ALLS AND CLOSED SYSTEMS.*
3. *ADDS STRENGTH.*
4. *PERMITS MORE LOADING FILLER.*
5. *REPLACES GLUE.*
6. *CONSERVES STARCH.*

Another Stein-Hall contribution to the war effort of the Paper Industry.

This process has shown good results in the following papers: groundwood book, free book sheets, clay filled and pigment loaded papers, offset and bond papers.

Raw material and manpower limitations make it impossible for us to distribute the benefits of this Process as widely as normal conditions would permit. But we shall be glad to supply further information.

78 YEARS OF STARCH SERVICE

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FOUNDERS—STEIN • HALL RESEARCH FELLOWSHIP AT THE INSTITUTE OF PAPER CHEMISTRY, APPLETON, WIS.

The Association had twin birthday cakes at the Anniversary party on Thursday evening.

Fifth Vice President—Charles H. Reese, Nekoosa Edwards Paper Company

Secretary-treasurer — George W. Craigie, Cumberland Mills, Maine

A Get-Together Party Precedes Banquet Meeting

After two days of close application to the business sessions of the convention, the superintendents and their guests welcomed the big social event of the entire meeting—the banquet which was held on Thursday evening in the Grand Ballroom of the Hotel.

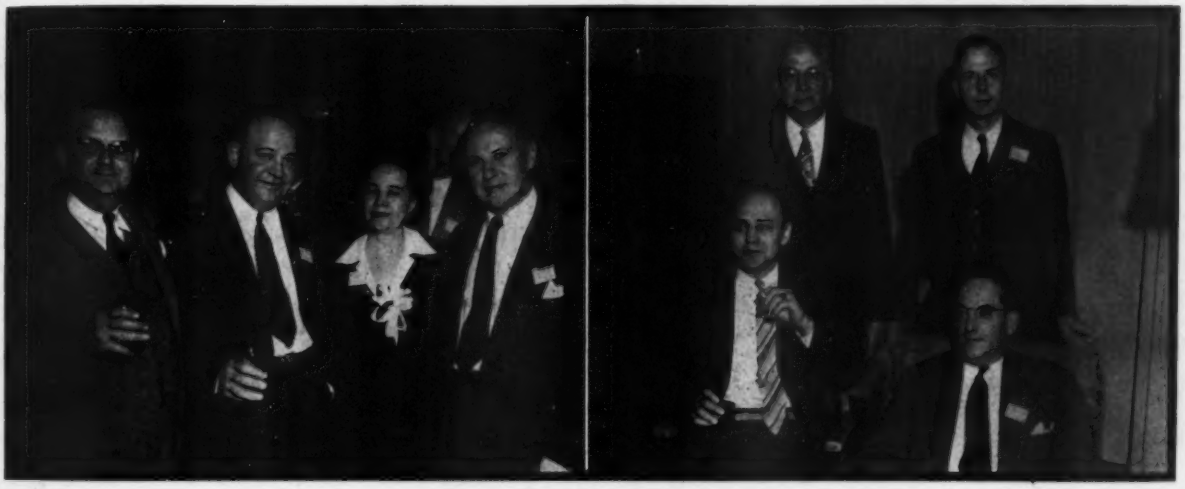
Preceding the dinner, the Allied Industries were hosts at a Get-Together Party which was held in the East and West Lounges. This was the second of such gatherings which have promoted friendship and good will and have widened acquaintance among the members of the Association.

The cloud of war hangs low over many such gatherings these days, and a large number of those participating in the social evening of this anniversary event had loved ones in the Armed Forces overseas. But there was a comaraderie and good fellowship—the spirit of a people not afraid, a people sure of ultimate Victory. They were fathers, mothers and loved ones whose courage is undaunted; who have accepted the challenge to keep production on the home front up to wartime requirements. But they have not allowed their vision to be dimmed, and they look forward to the time when the absent will return. When that time comes, they will not have forgotten how to play.

The climax of the Get-Together Party was the cake-cutting ceremony. Two huge birthday cakes, each decorated with twenty-five candles, graced the tables spread in the East Lounge.

The banquet on Thursday evening in the Grand Ballroom was an enjoyable social event.

Seated at the Speakers' Table at the Banquet on Thursday evening were: Left to Right — Peter J. Massey, first secretary and treasurer of the Association; Niles M. Anderson, newly elected first vice president; Ollie W. Messner, newly elected fourth vice president; R. G. Macdonald, national secretary of TAPPI; George W. Craigie, former field secretary of the Association who has been elected national secretary-treasurer; Mr. Thomas, Acting British Consul, Chicago; H. Duncan Hall, British Raw Material Mission, who was guest speaker; Stanford G. Blankinship, retiring president of the Association; Raymond L. Barton, elected president of the Association for the coming year; Homer H. Latimer, newly elected second vice president; Jack O'Brien, co-publisher "Paper Mill News"; Fred C. Boyce, first president of the Association; Robert L. Eminger, retiring national secretary-treasurer; and Raymond F. Bennett, newly elected third vice president.



They didn't have to be told to "look pleasant, please" for everyone was having a good time at the Party. Shown at the left (L to R) are: H. J. Knapp, The Fairbanks Co.; Frank E. Boli, Wm. Powell Co.; Mrs. and Mr. C. C. Jacobi, Sandy Hill Iron & Brass Works. In the picture at the right are (standing) Fred C. Boyce, the Association's first president and A. H. Stanton, Magnus Chemical Co.; (seated, with glass) Dave DeZurik, DeZurik Shower Co., and G. A. Thompson, Jr., B. F. Perkins & Sons, Inc.

Everyone seemed to have a good time at the Get-Together Party given by the Allied Industries preceding the banquet on Thursday evening. Left to Right (across the page): R. A. Packard, T. E. Healey, and J. J. Powers, of the Smith Paper Company; A. C. Lutz, B. F. Goodrich Co. (Akron); C. L. Clark and C. Vicario, Nash Engineering Co.; Wm. F. Butler, Sanitary Paper Mills, and Geo. H. Pountain, International Paper Co. (Palmer, N. Y.).

The four smiling people in the picture below have been to a number of conventions. At the left is R. F. Kohs, who retired as general superintendent of Detroit Sulphite Pulp and Paper Co. during the past year. He had been in the paper industry for half a century. Next to him is Mrs. Kohs, with Mrs. W. Wiberg and Mr. Wiberg, who is with the Gilbert Paper Co., Menasha, Wisconsin.

The Convention drew a large delegation from the Michigan Division of the Association. The "Michiganeers" were proud of the fact that the Michigan Division was the first Division organized after the Association was founded. The national Association was organized in June, 1919, and the Michigan Division was organized in July, so it really was practically a double anniversary for the Michigan delegates. Seated at the table in the picture above are: (Reading counterclockwise) L. La Liberte, of Kalamazoo Vegetable Parchment Co.; Al. Perlick, KVP; Mrs. Glen Sutton and Mr. Sutton, who is with Sutherland Paper Co.; Mrs. Leo A. Willoughby and Mr. Willoughby, of Bryant Paper Co.; Mrs. Weller and Arnold Weller, of Sutherland Paper Co.; David B. Garhart, repr. General Electric Co. (Grand Rapids); Edw. J. Thom, Howard Smith Paper Mills, Ltd.; and Mrs. L. La Liberte. Mr. Sutton is the present chairman of the Michigan Division; Messrs. Perlick and La Liberte are past chairmen of that Division.

Presiding as hostesses were Mrs. Raymond Barton and Mrs. Niles M. Anderson, with a coterie of lovely ladies who served cake and coffee. The famous silver service of the Edgewater Beach Hotel lent an air to the occasion. Each lady present was given a beautiful gardenia corsage.

▶▶▶ The banquet was informal, and by 7:30 that evening the Ballroom of the hotel was filled to capacity with dinner guests. There was music; a good dinner delighted everyone, and a truly good time was had by all.

Following the dinner were the introductions and presentations. President Blankenship presiding as toastmaster, introduced Fred C. Boyce, the first president of the Association. Next in order were: Peter J. Massey, first secretary and treasurer of the Association; John H. O'Connell and Edw. T. A. Coughlin, both past-presidents and Allan Hyer, who is serving as chief of the distribution section, Paper Division of the WPB in Washington.

Mr. Boyce then introduced Robert L. Eminger who has been national secretary-treasurer of the Association since 1928. Because Mr. Eminger is retiring this year, Mr. Boyce presented him with a handsome wrist watch as a token of the love and esteem felt for him by the Association.

The next presentation by Mr. Boyce was the Past President's jewel, which he gave to Mr. Blankinship.

Homer H. Latimer, newly elected second vice president, presented gifts to the wives of the retiring president, and the incoming president.

At this point in the program, Retiring President Blankinship announced that Mrs. Blankinship had enjoyed packing and unpacking for her trip to the Convention. However, even an annual convention could not lure her away from home after their son, Stanford G. Blankinship, Jr., wired that he would soon be home on leave after a long stay in the Aleutians. He is a petty officer in the Navy.

The L. D. Post trophy given annually to the retiring president of the Association by *Paper Mill News* was then presented to Mr. Blankinship by Jack O'Brien, one of the co-publishers of that magazine. This gift was a fine Hamilton watch.

The guest speaker at the dinner meeting was W. Duncan Hall, British Raw Material Mission, Washington, D. C. Speaking on the subject "Commonwealth and Empire," Mr. Hall drew a picture of the vital raw materials so needed by the United Nations, dwelling, of course, on the need for paper and pulp. He counted pulp as one of the critically short raw materials. The speaker discussed all phases of world economy and the probable postwar policy of Great Britain. Tariffs and world trade also drew comment.

At the close of the meeting, the Ballroom was cleared and the Superintendents and their ladies enjoyed dancing with music by Lou Diamond and his orchestra.

Interest Holds on Through Last Day

There was no letting down on the last day of the Convention—the Friday sessions seemed to draw as large an attendance as the earlier ones. The morning was devoted to four group meetings. The chairmen were:

Board—James Rogers II
Fine Papers—Homer H. Latimer
Coated Papers—Ronald Hynes
Kraft—Elmer M. Leavitt

These sessions held through the forenoon, closing just in time to permit everyone to attend the Luncheon Meeting—the last social session of the Convention. This luncheon was held in the Marine Dining Room, with T. E. Dial, Socony-Vacuum Oil Company, New York, presiding as toastmaster. Mr. Dial was retiring as chairman of the Allied Industrial Affiliates.

YOU'LL GET SERVICE A PLENTY FROM APPLETON FELTS TOO!

THE service that paper mills expect from quality equipment, designed and manufactured with technical foresight to meet today's high speed production requirements of paper mills, is service as dependable as that rendered for the paratrooper.

Appleton Felts are preferred by paper mills since 1890. During these years they have progressed with the industry, each year fully meeting the production requirements placed upon them.

make APPLETON FELTS good paper

Appleton Woolen Mills

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The table pictured below boasted three past presidents of the Association. Seated in the foreground is W. W. Cronkhite, General Electric Co. Left to Right: C. H. Kent, Hercules Powder Co.; E. T. A. Coughlin, Bryant Paper Co., a past president; Fred Rooney, Wisconsin Wire Works, another past president; W. E. Neumeyer, Holyoke Wire Cloth Co.; Robert M. Gale, Philadelphia Felt Co.; Charles Champion, Millers Falls Paper Co., a past president, and E. R. Mac Laren, Albany Felt Co.

They didn't mind being photographed — the group illustrated above, and they were "having a fine time, thank you." Left to Right: P. A. Collins, Warren Steam Pump Co.; W. H. Toppan, Consolidated Engineering Co.; H. L. Glass, J. G. Rearick, and S. S. Wilson, Warren Steam Pump Co.

At the speakers' table were four past presidents of the Association: Fred J. Rooney, Edw. T. A. Coughlin, John H. O'Connell, and F. Leroy Zellers, all of whom were introduced. Fred C. Boyce, first president of the Association, also past presidents William H. Brydges and Killey Terry were asked to take a bow, as were Retiring President Blankinship and Incoming President Ray Barton. Robert L. Eminger, retiring as secretary-treasurer, was given an ovation.

"Invasion"—and Then

No more timely subject could have been chosen for the address at the luncheon meeting and after hearing the speaker, Frank Smothers, Chief of the Editorial Staff of the *Chicago Sun*, one could easily believe that it would have been difficult to find any speaker who could have presented as many facts in such a convincing and dynamic manner. Mr. Smothers' subject "The Immediate Problem of the Invasion—and After," was treated with a wealth of information wherein might be found the answers to many questions being asked today. His remarks were not based on theories—Mr. Smothers has been there. He was a foreign correspondent in China when the war between China and Japan began. Later, he was in the European war theatre, winding up in Italy, where he was given "leave" by Il Duce.

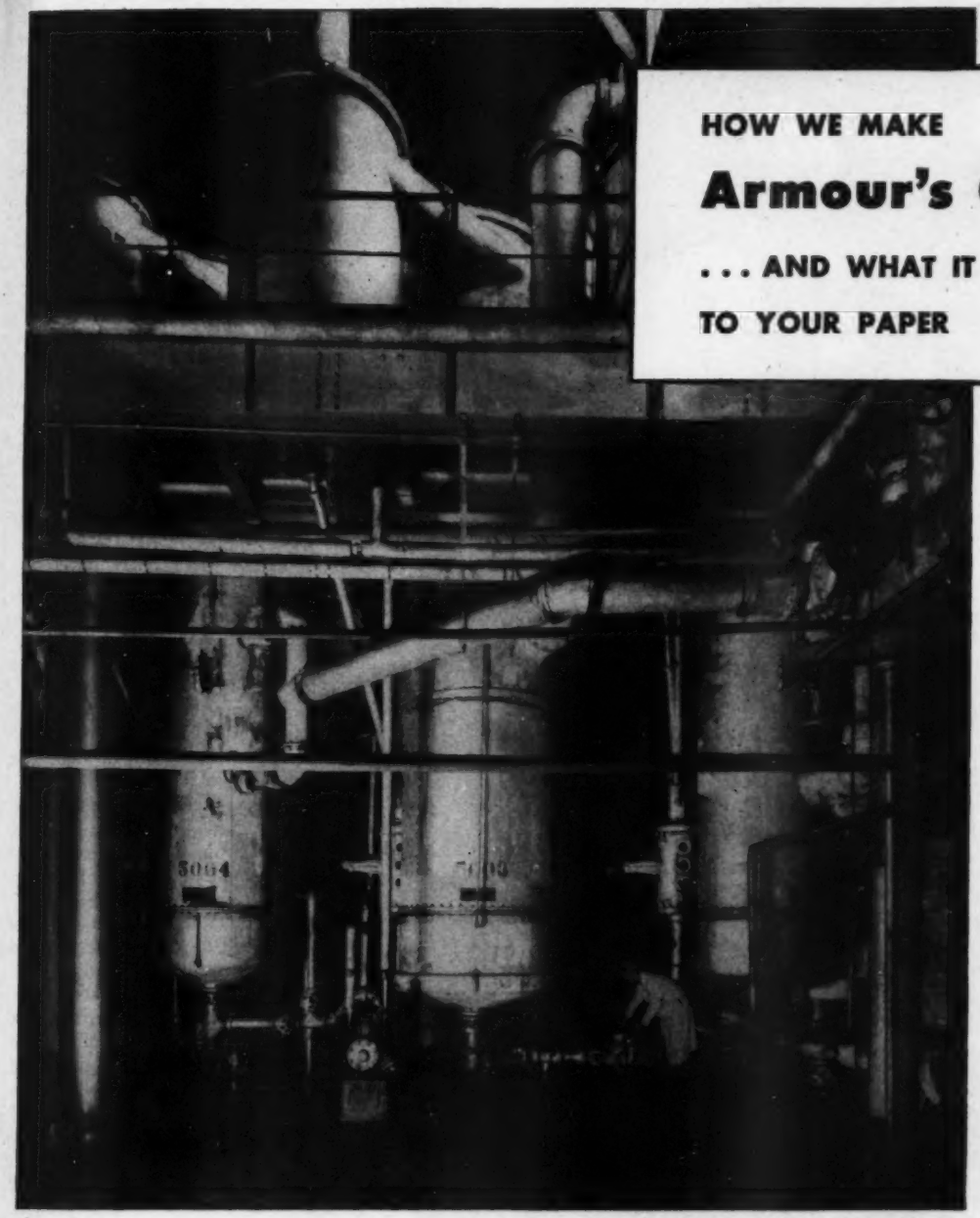
The speaker began his talk by saying he hoped he was not expected to say when the invasion would occur or how long the War would last. He said that the German propaganda story, so emphatically told, that invasion would fail "ain't necessarily so." He reminded his listeners that no one knows whether there will be an Allied invasion of the Balkans or Southern France, but he said he believed that will be minor compared with the invasion that will be launched from the west.

"One thing is a fact," he said: "We know we are going to win. We do not know just when but we do know we can look forward to Victory in a shorter time than the five- or ten-year war some people have talked about.

"I am convinced," he said, "that we are not making sufficient progress today and we are not making our goals as high as they should be."

"It is absolutely essential we should fight the war to keep the Germans

George W. Craigie at the registration desk on the opening day of the meeting. Mr. Craigie was elected secretary-treasurer of the Association.



HOW WE MAKE
Armour's Glue
. . . AND WHAT IT MEANS TO YOUR PAPER

These Machines Evaporate Water from the Glue

From these towering evaporators comes Armour's Glue. This is one of the last processes in making animal glue. It was one of the hardest to control until this equipment was especially designed for concentrating glue liquors.

In the old days, glue liquors lost more adhesive qualities in the evaporating process than in any other step of manufacture. But these new climbing film evaporators, with their automatic time and temperature controls, and their specially engineered design, turn out a standardized product . . . and *protect* the adhesiveness of every batch.

Thanks to this scientific evaporation, Armour's Glue has an extra strength factor and a complete uniformity that means better glue performance for you.

Scientific Evaporation Means Better Sizing

Better sizing requires glue that is light in color and pliable . . . with a high viscosity and jelly strength. You can be *sure* of those qualities when you use Armour's Glue in your sizing vats. And that's because of the scientific evaparation process, *plus* all the carefully controlled steps preceding it!

At present, demand for certain grades of Armour's glue is greater than the supply. And while we may be unable to supply exactly the grade you want, we will be glad to discuss your problems with you with a view to suggesting more efficient use of glue that is available.

Size it best with Armour's

ARMOUR *Glue* DIVISION

Manufacturers of Hide Glue, Bone Glue, Flexible Glues, Soluble Dried Blood, Blood Albumin

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On the eve of the Association's Silver Anniversary convention, the Allied Industrial Affiliates gave a dinner in the Michigan Room of the Edgewater Beach Hotel.

and Japs from winning, but that is not a sufficient objective if we are to have a durable peace."

Early in his address, Mr. Smothers made this statement: "International political responsibility is the thing that I wish to talk about — the problems that face us as citizens."

"We should have a great democratic world organization . . . We must warn ourselves never to give way to despair if the course of such a democratic world organization is disappointing. What we are going to win from the war is not a certainty, but we *can* win the opportunity for a peace that will progress on a stable basis. The amount of opportunity, the amount of stability that our world organization has immediately after the war depends upon the progress we make here and now. These are precious months to us. There is a bond of common danger that unites us.

"It is essential that our world organization move as rapidly as is possible for the extension of freedom where it does not now exist."

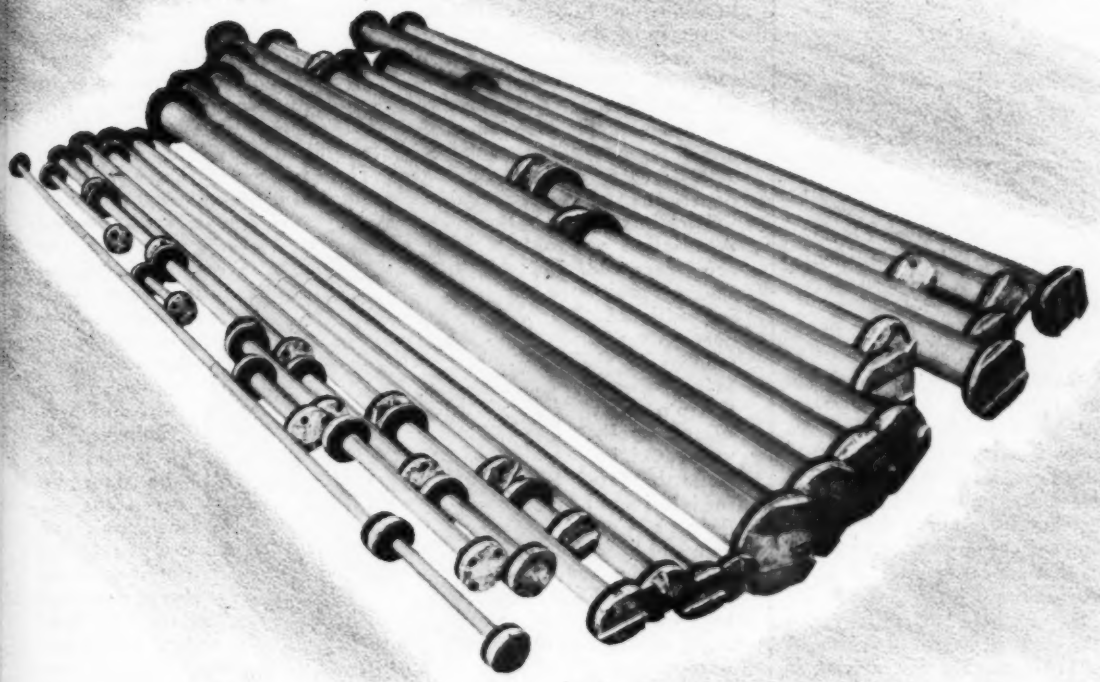
The speaker drew a vivid picture of the rise of China and its educational progress. He then drew a comparative sketch of the percentage of literacy in the Dutch East Indies.

Mr. Smothers then spoke of Germany, and said he did not believe the German situation could be solved unless we have a democratic world organization. He did not believe that Germany's part in the war should be forgiven and forgotten. He stated emphatically that Germany should be disarmed and that for a considerable period we should invade Germany and see that the peace is going to last. The speaker referred to reports of the Soviet Union's desire for gigantic reparations from Germany after the war. He believed such a move would mean the enslavement of most of the German people for a long period of time. It was, he said, necessary, therefore, that American statesmen should move toward removing the thought of slavery which seems to be anticipated by the Soviets. We can do this only by giving assurance to the Soviet Union that collective security is not a wild gamble.

Mr. Smothers said we will never have peace with Germany until there comes into being the kind of a Germany that wants peace. This will not come to pass until there is a genuine revolution in Germany. He said he believed such a revolution would take

WELDED STAINLESS STEEL PIPE

for PRESSURE, CORROSION, HEAT RESISTING, AND MECHANICAL PURPOSES



THE Stainless Steel Division of Pittsburgh Piping and Equipment Company is equipped to fill your Stainless Steel Pipe and Tubing requirements in various alloys and in sizes ranging from 4" O. D. to 24" O. D. . . . wall thickness 7/64" to 1/2" and in any desired lengths.

The relative high cost of raw materials makes it imperative that the fabrication of Stainless Pipe and Tubing is entrusted to specialists in this line of manufacture.

Our complete facilities for bending, welding, machining, annealing, and testing, plus an experienced personnel to perform the various operations, is your assurance of receiving stainless pipe that is uniform in roundness and in quality of welding. Data Sheet covering sizes and alloys will be sent upon request.

We also fabricate a complete line of Stainless Steel Welding Fittings of various alloys and in sizes ranging from 1" to 24". Bulletin S-306 gives complete information on fittings.

For further information write our Stainless Steel Division or contact our nearest representative.

Let's All Back The Attack
Buy EXTRA War Bonds

STAINLESS STEEL DIVISION

Pittsburgh Piping AND EQUIPMENT COMPANY

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Woolworth Building, New York · Occidental Building, Indianapolis · Peoples Gas Building, Chicago · Book Tower, Detroit
Public Square Building, Cleveland · · 10 High Street, Boston · · 525 Market Street, San Francisco

place in Germany. He closed his address by saying:

"We are committed to a world organization. Our Government has done great work in leading the Soviet Union into a spirit of co-operation for this organization. The big job we have as citizens is to give our support to the construction of a great world organization that can be representative of all people, and at the same time to realize that no nation is better than its organization."

Paper Industry's Problems and WPB

Following the luncheon meeting, a general conference session in the East Lounge closed the meetings of the 25th annual convention. The speaker at this meeting was Allan Hyer, Chief, Distribution Section, Pulp and Paper Division of the WPB. His subject was "WPB and the Paper Industry." The main theme of Mr. Hyer's address was the industry's shortage of pulp, the machinery needed by the mills, and the various Government regulations under which the industry must operate. Mr. Hyer revealed some very helpful facts and gave those present a better understanding of the operations they must face during the war. He also threw light on shortages, and the efforts that are being made to alleviate this handicap.

With the formal program concluded, the Association began a new quarter of a century. The first meeting on that calendar will be held in New York City. The time, June 12, 13 and 14, 1945. The place, the Hotel Commodore.

◆

LIFE MEMBERSHIPS AWARDED TO FIVE IN SUPTS. ASS'N

Life memberships were awarded to five members by the board of trustees of The American Pulp and Paper Mill Superintendents Association at the annual meeting held in Chicago recently. The honored members are:

Albert F. Piepenberg, Combined Locks Paper Company, Appleton, Wis.

Richard M. Radsch, Appleton Machine Company, Appleton, Wisconsin.

Paul A. Smith, Blandin Paper Company, Grand Rapids, Michigan.

B. A. Krebs, Hammermill Paper Company, Erie, Pennsylvania.

Frank W. Monaghan, St. Helens Pulp & Paper Company, St. Helens, Oregon.

Mr. Piepenberg has served forty-eight years with the Combined Locks company, and Mr. Krebs has been in the industry for more than fifty years.

Story of an Open Door

The keystone emblem of The American Pulp and Paper Mill Superintendents Association which appears on page 318, also might be symbolic of an open door. In 1926, Robert L. Eminger walked through the portals of that door, over the threshold of "Confidence" to become full-time secretary of the Association. For two years previously, he had divided his time between the duties of that office and his work with the Miami Paper Company. An added responsibility became his in 1928 when he assumed the office of treasurer of the Association.

Back in 1921, when the Association was only two years old, Mr. Eminger was working with H. W. Server, superintendent of the Miami Paper Company, West Carrollton, Ohio (now the Oxford-Miami Paper Company). At the 1924 annual meeting in Dayton, Ohio, he was made secretary of the Association, dividing his time between the Association work and his regular work at the Miami company. In 1926, he was made full-time secretary and carried on this work until the 1928 meeting in Pittsburgh. At that meeting, Peter J. Massey, who had been treasurer of the Association, resigned, and Mr. Eminger was made secretary-treasurer which position he has held since that time.

This year, Mr. Eminger walked out of that open door officially, for he is retiring from public life to enjoy a well-earned vacation. The door of the Association, however, will remain open to "Bob," for at the meeting of the Board of Trustees on Tuesday preceding the opening of the 1944 annual meeting, he was made a life member of the Association. He is retired on a pension. Since he undertook the Association work, Mr. Eminger has never missed an annual meeting.

Robert L. Eminger was born and raised in Miamisburg, Ohio, and in 1921, when he first became associated with the Miami Paper Company, the Emingers acquired a home—a large house with 14 rooms.

After Mr. Eminger became connected with the Association, a part of the first floor of that home was turned into an office. Since then, the mail address of The American Pulp and Paper Mill Superintendents Association has been 54 North Main Street, Miamisburg, Ohio—the number of the Eminger home. Later, a suite of two bedrooms and a bathroom, just over the office, was fitted up as the guest suite. The "Welcome" sign was always out, and many callers at the Association office "stopped over" to enjoy the rare hospitality of this unique home and office.

The symbol of the open door applies to both Mr. and Mrs. Eminger, for it is said that the door between the Association's office and the Eminger home always remained open — "Bob" wanted it that way. Mrs. Eminger too, always has been on the job along with him, a loyal support and inspiration. She has attended nineteen annual meetings since he became connected with the Association, which means she has missed only one meeting.

"Bob" says he has never had time for hobbies. He says the Association's *Year Book* took about all the time most men devote to hobbies—it represents the time most men would have given to playing golf or fishing.

Mr. and Mrs. Eminger look forward to doing a lot of things they never had time to do. With wartime conditions to consider, they don't know yet just what those things will be, but anyone who knows this cheerful, lovable couple, may be sure that they will have a lot of fun—no matter where they go or what they do. They intend to keep a home in Miamisburg. And from almost every state, good wishes will fly to them and keep alive a garden of beautiful memories.

A great new symbol rises in the process equipment industry

In the past few months, four important manufacturers, each an outstanding specialist in its field, have pooled their facilities to become one integrated and far more useful organization in the process equipment industry.

Each of our component units retains its former personnel. To these executives, engineers and production men we have added a distinguished engineering and research staff, plus overall unification of functions and responsibilities, plus the enormous resources of the Plate and Welding Division of GATC. The result is that today our facilities now match our determination to serve you well.

GENERAL AMERICAN PROCESS EQUIPMENT

A Division of

GENERAL AMERICAN TRANSPORTATION CORPORATION

Composed of:

LOUISVILLE DRYING MACHINERY CO.
(Rotary Dryers & Presses)

THE CONKEY COMPANY
(Filters and Evaporators)

THE TURBO-MIXER CORPORATION
(Mixers & Agitators)

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SAFETY

PRESIDENT ROOSEVELT OPENS DRIVE TO CUT INDUSTRIAL ACCIDENTS

On May 25 President Roosevelt opened the campaign of the U. S. Department of Labor to cut industrial accidents by 1,000,000 in the next twelve months in the interest of war production. In a letter to Secretary of Labor Frances Perkins he called upon management and labor to cooperate in the drive. Secretary Perkins read the letter at a meeting of the National Committee for the Conservation of Manpower, which she appointed before Pearl Harbor.

The Department of Labor, Miss Perkins said, will award a certificate of achievement to every industrial establishment that succeeds in accomplishing a reduction of 40 per cent in its own accident record during the next twelve months.

◆

▶▶▶ FOR PERFECTING a safety collar used in winder shafts, Otha Winningham and Elmer Anderson, employees of the National Container Corporation, Jacksonville, Florida, have received recognition from the National Safety Council. Each of these men also received a $50 war bond. This safety award received national honor when recognition was given in a coast-to-coast hookup over NBC on May 18. The National Safety Council's radio program "Out of the Shadows," gives public recognition to deserving safety discoveries.

◆

▶▶▶ A GROUP PROGRAM has been adopted by the Clifton Paper Board Company, Clifton, New Jersey, which provides its employes with life insurance, sick and accident benefits. The entire cost of the plan is defrayed by the company. The plan also includes visiting nurse service and the distribution of pamphlets on health conservation and accident prevention.

◆

▶▶▶ THE THUNDER BAY PAPER COMPANY, of Port Arthur, Canada, won the Ontario Pulp and Paper Makers' Safety Association shield for Class A mills in Ontario for the year 1943. This is the fourth consecutive win for the Thunder Bay mill and constitutes a record for the trophy. It may be added that in the year 1940 Thunder Bay won the shield with a "no lost-time accident" record, the first and only time it has been accomplished.

◆

SAFETY SCORES

▶▶▶ IN THE ANNUAL Paper Industry Safety Contest which began July 1, 1943, reports received for April show eight mills maintaining a perfect record. These mills are:

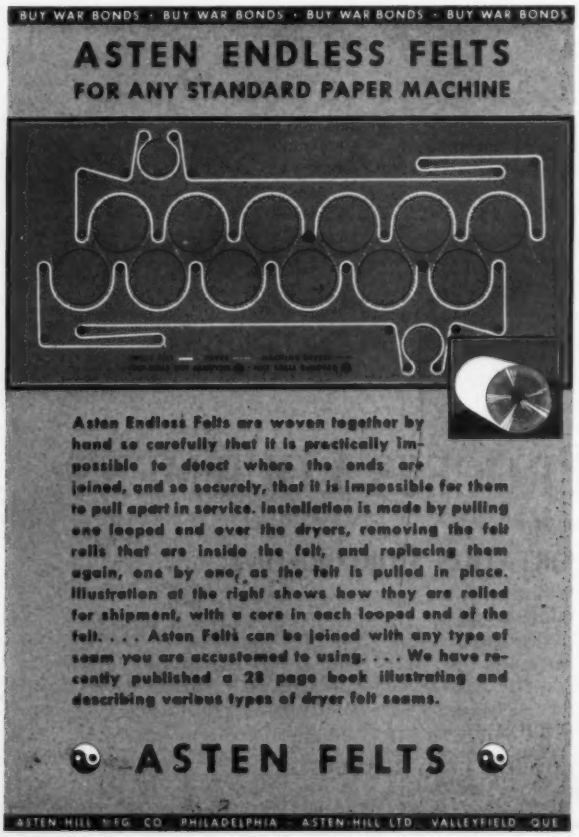
Division I—Pulp and Paper Mills
Groups A and B—(none)

Group C—
Strathmore Paper Co. (Woronoco Mills), West Springfield, Mass.

Group D—
Marathon Paper Mills Co., Rothschild, Wis.
Spaulding Fibre Co., Inc., North Rochester, N. H.
International Paper Co., Riley, Me.

Division II—Paper and Board Remanufacturing
Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.
Kimberly-Clark Corp. (Atlas Mill), Appleton, Wis.
South West Box Co., Sand Springs, Okla.
Bay West Paper Co., Green Bay, Wis.

The paper industry safety contest is conducted among member mills of the Paper and Pulp Section of the National Safety Council, and runs for twelve months. The present contest covers the period July 1, 1943, to June 30, 1944.


BUY WAR BONDS • BUY WAR BONDS • BUY WAR BONDS • BUY WAR BONDS
ASTEN ENDLESS FELTS
FOR ANY STANDARD PAPER MACHINE
Asten Endless Felts are woven together by hand so carefully that it is practically impossible to detect where the ends are joined, and so securely, that it is impossible for them to pull apart in service. Installation is made by pulling one looped end over the dryers, removing the felt rolls that are inside the felt, and replacing them again, one by one, as the felt is pulled in place. Illustration at the right shows how they are rolled for shipment, with a core in each looped end of the felt. . . . Asten Felts can be joined with any type of seam you are accustomed to using. . . . We have recently published a 28 page book illustrating and describing various types of dryer felt seams.
ASTEN FELTS
ASTEN-HILL MFG. CO. PHILADELPHIA • ASTEN-HILL LTD. VALLEYFIELD QUE.

Specify
WALDRON Flexible COUPLINGS
A TYPE AND SIZE FOR EVERY PURPOSE
FORGED STEEL
For All Drives—All Loads
Investigate the reason why WALDRON is the preferred coupling throughout all industries where continuous trouble free operation is so essential. You, too, will find that it is the one coupling designed and built to avoid ALL the common causes of costly shutdowns and repairs on vital drives.
Send for catalog. Examine design and construction features. Judge for yourself.
JOHN WALDRON CORP.
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COUPLINGS

METHYL 4BPX CONC.

No! We're not playing a guessing game. There wouldn't be any point to it. Calco's Methyl Violet 4BPX Conc. is too well known to Paper men as the industry standard!

And why? Because it's the outstanding violet for money value. Because it's the strongest tinctorially at lowest cost. Because it possesses good solubility and dyeing properties. Because it can be used as a base color or shading color for practically all blue, violet or gray papers. Particularly when economy is of paramount importance to the job.

Ask your H. & M. representative to give you the specifications on Methyl Violet 4BPX Conc. as a beater color or calender stain.

HELLER & MERZ DEPARTMENT

CALCO CHEMICAL DIVISION • AMERICAN CYANAMID COMPANY

BOUND BROOK, N. J.

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ALLIED

TIMKEN HAS NEW SOUTH AMERICAN SUBSIDIARY

A subsidiary company has been organized, according to a recent announcement from The Timken Roller Bearing Company, Canton, Ohio. The new company is The Timken Roller Bearing Company of South America, which has been set up to service the millions of Timken bearings now operating in South America. After the war, under the direction of Jules A. Morland, the new firm will handle engineering development of Timken products in the Latin-American countries.

As part of its organization program, Timken now has in training at its Canton plant two young Brazilian engineers who are familiarizing themselves with the engineering production and application of Timken Roller bearings and steel. These engineers expect to remain a year and a half and then return to South America as field engineers and general representatives for the company.

◆

▸▸▸ IN COMPETITION WITH nearly 200 company magazines from all parts of the nation, *The Hercules Mixer,* published by Hercules Powder Company, Wilmington, Delaware, has been awarded third prize in the nation-wide cover contest sponsored by the American Red Cross to promote the 1944 War Fund Campaign. *The Mixer,* first issued in 1919, is one of the older continuously published house magazines in the nation. It is edited by Mrs. Evelyn Stoll Reinhardt.

◆

NEW LABORATORIES OF NATIONAL ADHESIVES

The extensive new laboratories of the National Adhesives Division of National Starch Products, Inc., are illustrated on this page. The laboratories are located at 270 Madison Avenue, New York City. At the same location, but not illustrated, are the Textile, Resyn, Adhesives, and Training Laboratories, as well as small capacity pilot plants for both the Adhesives and Starch Divisions.

These ultra-modern facilities, plus a fully equipped food kitchen for experimental work on edible starches, occupy the entire 10th floor of the modern steel and concrete building on the northwest corner of 39th street. National's general and eastern sales offices occupy the 9th floor of the same location.

The laboratory installations are brand-new, and a great deal of additional testing equipment representing the latest design is in evidence throughout. Thus, National has the facilities to service the exacting requirements of war industries and is prepared to solve the many adhesive and starch problems involved in postwar planning and reconversion.

◆

TOWMOTOR CORP. CELEBRATES ITS 25TH ANNIVERSARY

On its twenty-fifth anniversary, May 12, the Towmotor Corporation, Cleveland, Ohio, entertained its employees with a banquet at the Allerton Hotel.

Eight hundred men and women attended, and each was presented with a book published by the corporation. "25 Years—Towmotor." This book tells the story of the company's development from the time it was founded by F. W. Sears and his son, Lester M. Sears, down to the present time.

At the close of the ceremonies, employees with ten or more years of service, were presented with handsome watches by Lester M. Sears, president of Towmotor.

◆

DU PONT DEVELOPS A NEW ADHESIVE

A new adhesive, listed as Du Pont adhesive "78" has just been developed in the Laboratories of the Grasselli Chemicals Department of E. I. du Pont de Nemours & Company.

This adhesive contains all of the qualities of the water-soluble vinyl resin "glue" introduced last year. It is a companion adhesive to adhesive "77" introduced last August for the production of weatherproof paperboard shipping containers.

Containers utilizing either adhesive can be fashioned on standard boxboard machinery which may be operated at full speed without any special equipment.

◆

3 WAR PRODUCTION CONFERENCES HELD BY OAKITE PRODUCTS

Concurrently held in New York, Chicago and Los Angeles were the Oakite Third War Production Conferences on cleaning, descaling, derusting, degreasing and related production and maintenance operations. Participating with the entire field technical service representatives were the staffs of the mechanical engineering, chemical and research laboratories and general headquarters of Oakite Products, Inc.

These two-day sessions were devoted to the collating of field experience in order to determine the best and most practical methods for stepping up wartime production through speedier cleaning, due consideration being given to the emergencies of manpower and the shortage of time. Also discussed were concrete, workable techniques for prolonging equipment life; improving plant sanitation and maintenance; faster, more thorough cleaning in repair and overhaul procedures.

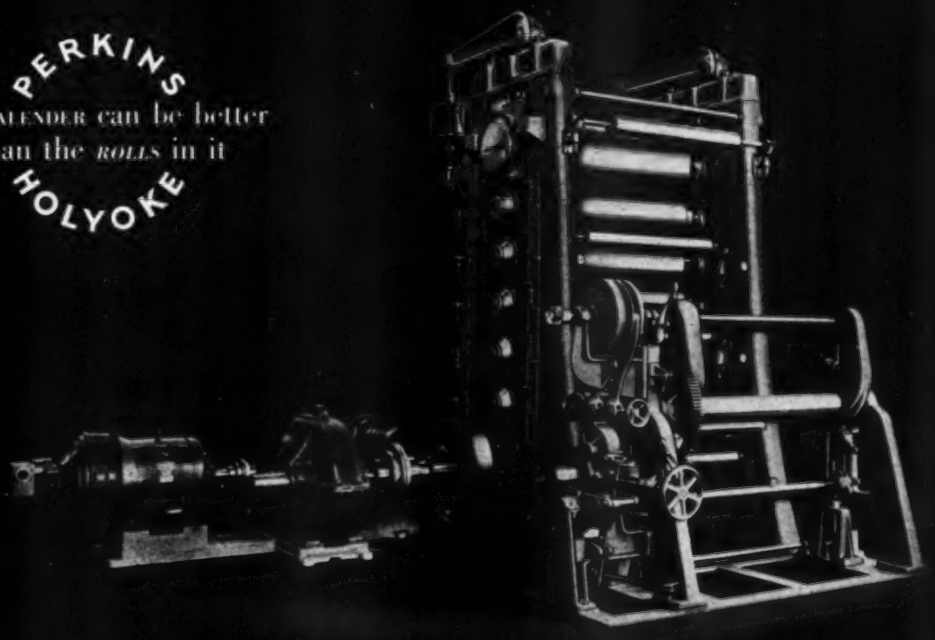
Of particular interest to the paper industry were the information and data exchanged by the technical service representatives revealing newly-devised, time-saving techniques for expediting such maintenance jobs as cleaning screen plates, fourdrinier

(Above) Technical Service Laboratory

(Above) Research Laboratory

(Left) Development Laboratory

PERKINS
No CALENDER can be better
than the *ROLLS* in it
HOLYOKE



PERKINS

B. F. PERKINS & SON, Inc.
HOLYOKE, MASS., U.S.A.
LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

wires, beaters, suction press rolls; descaling vacuum pumps and heat exchange units, as well as a wide range of pressure cleaning jobs.

Data and information resulting from the discussions held at the various meetings are freely available to all through the medium of the Oakite Technical Field Service.

◆

▶▶▶ ON NATIONAL MARITIME Day, May 22, the U. S. Maritime Commission presented Crocker-Wheeler Electric Manufacturing Company, Division of Joshua Hendy Iron Works, Ampere, New Jersey, the "M" Burgee and the Victory Fleet Flag. The "M" award was given for the manufacture and development of specially designed electrical equipment for Maritime Commission ships.

▶▶▶ THE TRADE NAME "ALLYMER" has been selected by the Columbia Chemical Division of Pittsburgh Plate Glass Company, Barberton, Ohio, for its complete line of Allyl Resin Monomers, formerly known as Columbia Resins, and designated as C.R. 39, etc. The respective numbers will be continued to designate types.

◆

WORTHINGTON BUYS ELECTRIC MACH'Y MANUFACTURING CO.

Of widespread interest was the announcement on May 27 that Worthington Pump & Machinery Corporation, Harrison, New Jersey, has purchased the Electric Machinery Manufacturing Company, of Minneapolis.

A joint statement issued by Harry C. Beaver, president of Worthington, and Walter H. Feldmann, head of Electric Machinery, contained the information that the Electric Machinery Manufacturing Company will continue to operate independently of other Worthington activities, and that Mr. Feldmann as president will continue. Other executive personnel also will remain.

◆

TWO IMPORTANT STAFF CHANGES AT BULKLEY, DUNTON

Two important changes have been announced by Bulkley, Dunton Pulp Company, Inc., New York.

Rex Vincent, a member of the technical staff, has moved to the New York office.

J. Wyman Flint has been appointed to the company's Tonnage Sales staff.

For the past several years, Mr. Vincent has been doing extensive research work in connection with pulp manufacturing, and the conversion of wood pulp, especially purified and dissolving pulps. His work has taken him to practically all of the important pulp producing and consuming centers in the United States and Canada. He will continue his technical and research work in the main office, New York.

Mr. Flint has been associated with the paper trade since 1915. In his new connection, he will specialize in the sale of publication papers. For the past six years he was sales executive with the Minnesota and Ontario Paper Company, handling publication sales. Prior to that, he was president of Dever Brothers Paper Company, of Milwaukee; the name was later changed to Flint Paper Company. He comes from an old family of papermakers; his grandfather, Wyman Flint, having been the founder of Wyman Flint and Sons, paper manufacturers of Bellows Falls, Vermont, established around 1870. His father, John W. Flint, was one of the founders of the Clermont Paper Company, which was among the first kraft paper mills in the United States.

Rex Vincent

J. Wyman Flint

ARMY-NAVY "E" AWARDS

Industrial Gear Manufacturing Company, Chicago—A colorful presentation program was given in connection with the award to this company of the Army-Navy "E" pennant. The ceremonies attending the award were held the evening of May 11 in the Paradise Ballroom in Chicago. There was music by The "Midshipmen," and the presentation of the pennant was made by Commander William C. Butler, Jr., U.S.N., Bureau of Ordnance, Navy Department, Washington, D. C. A. M. Scharek, president of Industrial Gear, accepted the award. Pins were given to the employees, and the "E" pennant was posted by the Color Guard of the U. S. Marine Corps. John Harrington, of the Columbia Broadcasting System, was master of ceremonies, and the professional handling of the program contributed to the success of the event. A banquet and entertainment followed the presentation ceremonies, to which a number of friends and business associates were invited.

White Star

Farrel-Birmingham Company, Inc., Ansonia, Connecticut—For the fifth time, the three plants of this company, in Ansonia and Derby (Conn.) and Buffalo (N. Y.), have received the "E" award. The "E" pennant was awarded to the three plants in March, 1942. It was subsequently renewed with a white star in October, 1942; March, 1943; September, 1943; and again in May, this year.

Infilco Incorporated, Chicago—This company won the Army-Navy "E" pennant for excellence in September, 1943. Last month, Infilco was given a second award for meritorious service when it was presented with its first white star.

They Blazed a Trail Through the Wilderness!

One hundred and forty years ago that vast, unexplored country west of the Mississippi was a land of mystery. Only the Indians knew its secrets; and they would not yield them easily to the hated white man. It was then that Lewis and Clark set out on their history-making expedition, blazing a path through the impenetrable wilderness and opening the way for American Progress. Here was one of the greatest examples of teamwork the world has known—the ability of men to pool their knowledge and talents and courage for a common cause.

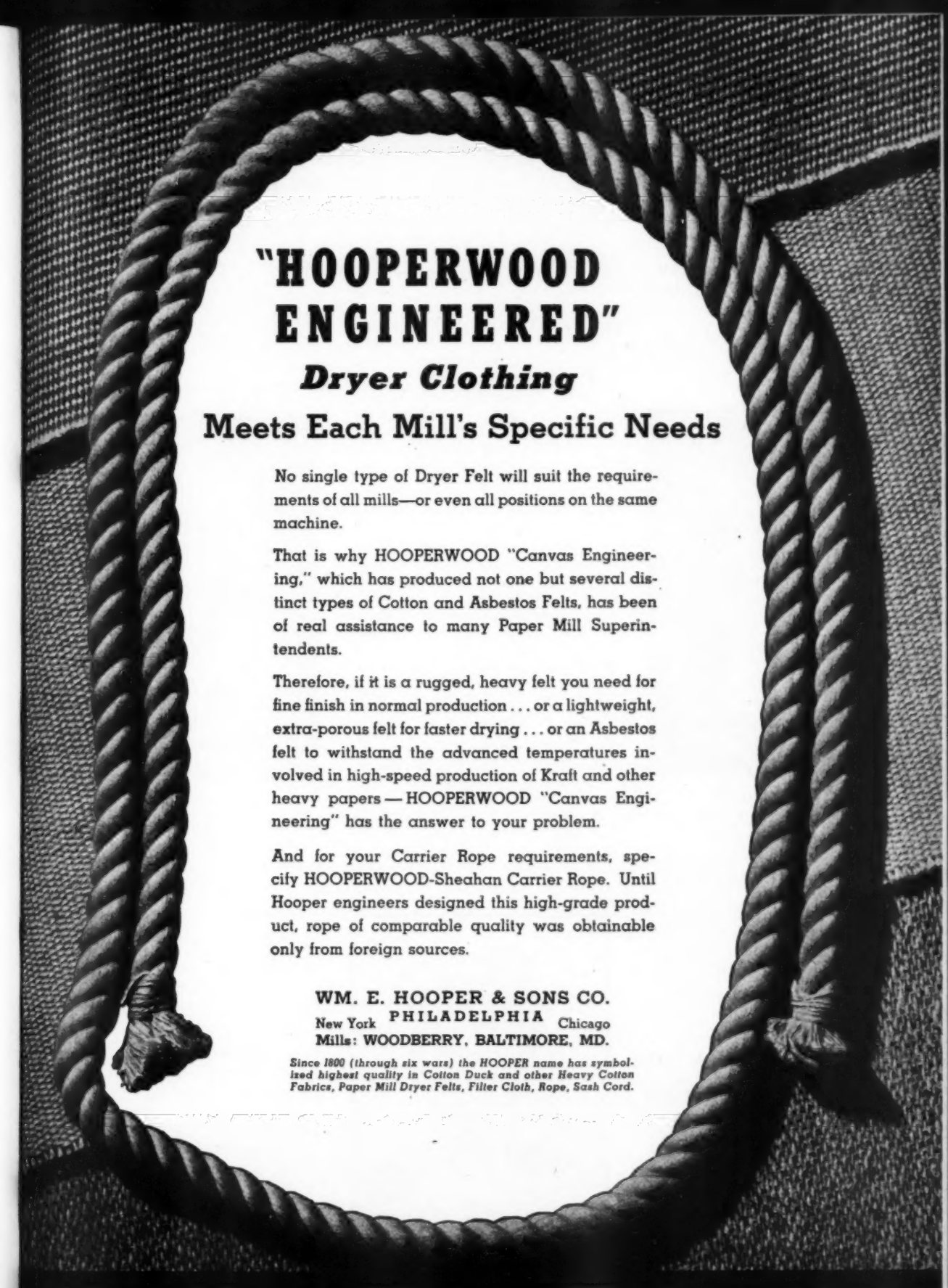
IT'S TEAMWORK HERE, TOO

The Paper Industry can show you many examples of where The Bevis Machine Company teamed up with paper-mill men to make better papers more efficiently and more profitably.

And to back up this record we consistently have invested in precision machine tools; trained skilled workmen to your way of doing things; accepted nothing but the most ingenious and resourceful designing; insisted upon materials worthy of your requirements and our judgment; and given all these ingredients a close and highly personalized management.

Is this the kind of *teamwork* you would like to draw upon in the years of opportunity ahead?

THE BEVIS MACHINE COMPANY
Middletown, Ohio



"HOOPERWOOD ENGINEERED"

Dryer Clothing

Meets Each Mill's Specific Needs

No single type of Dryer Felt will suit the requirements of all mills—or even all positions on the same machine.

That is why HOOPERWOOD "Canvas Engineering," which has produced not one but several distinct types of Cotton and Asbestos Felts, has been of real assistance to many Paper Mill Superintendents.

Therefore, if it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an Asbestos felt to withstand the advanced temperatures involved in high-speed production of Kraft and other heavy papers — HOOPERWOOD "Canvas Engineering" has the answer to your problem.

And for your Carrier Rope requirements, specify HOOPERWOOD-Sheahan Carrier Rope. Until Hooper engineers designed this high-grade product, rope of comparable quality was obtainable only from foreign sources.

WM. E. HOOPER & SONS CO.
New York **PHILADELPHIA** Chicago
Mills: WOODBERRY, BALTIMORE, MD.

Since 1800 (through six wars) the HOOPER name has symbolized highest quality in Cotton Duck and other Heavy Cotton Fabrics, Paper Mill Dryer Felts, Filter Cloth, Rope, Sash Cord.

HOOPERWOOD DRYER FELTS

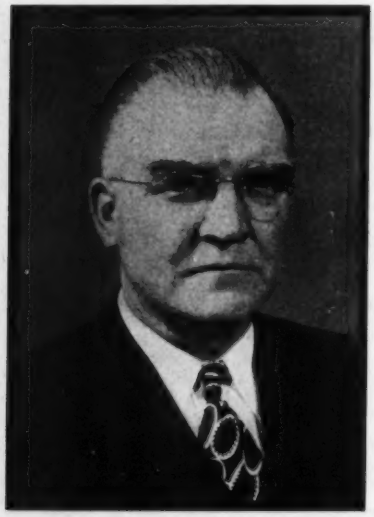
COTTON AND ASBESTOS

NAMES *in the* NEWS

Personals

PHILIP CAREY COMPANY NAMES PRODUCTION HEAD

The appointment of C. B. Pooler as vice president in charge of manufacturing is announced by The Philip Carey Manufacturing Company, Lockland, Cincinnati, Ohio.



C. B. Pooler

Mr. Pooler has spent practically all of his life in the building material industry. An electrical and mechanical engineer, he has served as production manager, plant manager, division operations manager, manager of labor relations in plants producing fabricated steel, metal lath, insulating board, roofing paints, paper, asbestos, and gypsum products.

The Carey Company operates nine plants in United States and Canada.

◆

GORDON DILNO WILL DIRECT MICHIGAN'S WASTEPAPER PROGRAM

Wastepaper collection was discussed at a conference in Kalamazoo, Michigan, when Glenn E. Graham, vice president of the Sutherland Paper Company and one of the members of the conservation committee of the wastepaper consuming industry, summoned executives for a meeting.

At this meeting, Gordon J. Dilno, advertising manager of the Sutherland Paper Company, Kalamazoo, was named Michigan director of a statewide organization to aid in future wastepaper collection programs.

Chief concern of the mill executives is the inevitable slump in wastepaper collection when summer vacations close the schools and a valuable factor in the salvage program is thus automatically suspended. Another concern is the fact that it is estimated there are 253 communities in the State where salvage campaigns must be organized to keep Michigan's mills rolling. In a great majority of these communities there is now no continuing collection program—that job has been placed in Dilno's hands.

◆

▶▶▶ *S. L. de Carteret* has resigned as deputy-minister for air to return to private business and is being succeeded by *H. F. Gordon,* assistant deputy-minister. Mr. de Carteret had been on loan to the R. C. A. F. from the Canadian International Paper Company since shortly after the outbreak of the War. He returned to his post as vice-president and general manager of the firm because of the pressure of business.

◆

▶▶▶ Before he was called into active duty from the Naval Reserve Officer's Corps, in 1941, *Lieutenant Commander Douglas Aidie,* was assistant treasurer of the Taylor Logan Paper Company, Holyoke, Massachusetts. He is now attached to lighter than air duty as a member of the staff of a fleet wing commander.

Douglas Aidie

DR. KNOWLES BECOMES TECH. DIRECTOR OF GEN. AMER. PROCESS EQUIPM'T

The appointment of Dr. C. L. Knowles as technical director of General American Process Equipment, with head offices at Louisville, Kentucky, is announced.

Dr. Knowles has resigned his position as chemical sales director of The Dorr Company, Inc., to become associated with General American Process

Dr. C. L. Knowles

Equipment, which is a division of General American Transportation Corporation.

Twenty years as sales engineer and manager of the Eastern Sales Division of The Dorr Company, Inc., has given Dr. Knowles an unusual background of experience in chemical processes. In addition, he is vice president of the Chemists Club and is a director of the American Institute of Chemical Engineers.

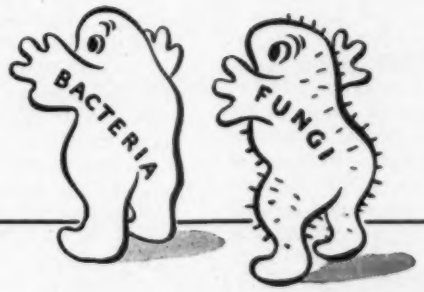
Dr. Knowles will be located at the New York office of General American Process Equipment, 420 Lexington Avenue, New York City.

◆

DR. OTTO MAASS WINS CHEMICAL SOC. MEDAL

The Society of Chemical Industry (Canada) medal for 1944 has been awarded to Dr. Otto Maass for his outstanding contribution to chemistry in Canada, both at McGill University, where he is director of the Department of Chemistry, and in industry. Dr. Maass' close association with the pulp

STOPS IMPS THAT THREATEN YOUR PRODUCTION THIS SUMMER



Fungi and bacteria, imps that hamper important wartime pulp and paper production, are beginning their summer offensive. Why stand for the losses caused by these organisms when you can break up their attack by the application of Santobrite.

The use of Santobrite controls slime, fungi and bacteria which cause slime spots, breaks, blinded wires, plugged felts, dirty stock, clogged water lines, rotted felts and other obstacles to good mill operation.

Santobrite is economical. It is safe and easy to apply. Properly used, it gives *positive protection* against fungi and bacteria.

Complete information on Santobrite will be sent promptly upon request. The coupon is for your convenience. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, Toronto.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

MAIL COUPON FOR *FREE* BULLETIN

Monsanto Chemical Company, 1700 S. 2nd St., St. Louis 4, Mo.
Please send me, free, a copy of your technical Bulletin O-5 "Santobrite For Microorganism Control In The Pulp and Paper Industry" and other pertinent information.

*Name*_____

*Company*_____

*Street*_____

*City and Zone*_____ *State*_____

and paper industry is well known; he is consulting physical chemistry and general director of the Pulp and Paper Research Institute of Canada, and honorary life member of the Technical Section of the Canadian Pulp and Paper Association.

Dr. Maass was educated at Montreal High School and McGill University, where he obtained his B. A. and M. Sc., and later studied at the University of Berlin, Germany, and Harvard University, where he obtained his Ph. D. in 1919. He has been professor in charge of physical chemistry at McGill University since 1917, was made Macdonald Professor of Physical Chemistry in 1923, and director of the department of chemistry in 1937. Besides his other activities, he is assistant to the president of the National Research Council of Canada and director of chemical warfare and smoke of the Department of National Defense.

Dr. Maass has been a member of the Montreal Section of the Society of Chemical Industry for many years, and was chairman of the Section for 1932-33. He is also a Fellow of the Royal Society of Canada; member of the London Society of Chemical Industry, American Chemical Society, and of the Canadian Institute of Chemistry of which he was president for 1938-39. He was made a member of the National Research Council of Canada in 1939, and Fellow of the Royal Society, London, in 1940. In 1941 he received the degree of LL.D. from the University of Manitoba.

◆

▶▶▶ The retirement of *Charles A. Bigelow,* vice president, director, and member of the finance committee of Hercules Powder Company, was announced as of June 1. Mr. Bigelow became associated with Hercules in 1921 when Aetna Explosives Company was acquired by Hercules, and shortly thereafter he was placed in charge of explosive manufacture. In 1928, he was made general manager of the Explosives Department and elected to the board of directors. Subsequently, he became vice president and a member of the executive committee.

◆

BENSLEY MADE GENERAL MANAGER OF 3 PLANTS BY H. K. PORTER, INC.

General manager in charge of its three plants is the appointment conferred upon M. D. Bensley by the H. K. Porter Company, Inc., of Pittsburgh, Pennsylvania. The three plants, which recently became Porter subsidiaries, are Mt. Vernon Car Manufacturing Company, Wheel Foundry Division of Mt. Vernon Car, and J. P. Devine Manufacturing Company.

M. D. Bensley

Mr. Bensley comes to the Porter company from the Shenango Penn Mold Company, Pittsburgh, where he was assistant to the president. He had been associated with that company for fifteen years. Mr. Bensley is a member of the American Society for Metals, American Foundrymen's Association, and the Association of Iron and Steel Engineers.

◆

▶▶▶ Assistant general manager of Parsons Paper Company, Holyoke, Massachusetts, *Edward P. Bagg III,* recently has been promoted from ensign to lieutenant (j.g.) in the Naval Reserve. Lieutenant Bagg is assigned to duty aboard a sub-chaser on the East coast. His father is president of the Parsons Paper Company.

Edward P. Bagg III

FOSTER D. SNELL CHEMIST, ELECTED TO A FELLOWSHIP

Frank Moody Biffen, for fifteen years on the staff of Foster D. Snell, Inc., consulting chemists and engineers, was recently elected to Fellowship in the Institute of Chemistry of Great Britain and Ireland.

The Institute, founded in 1877 and incorporated by Royal Charter in 1885, requires of its members a rigid standard of scientific proficiency and personal integrity and enjoys a high position among professional organizations. A Fellowship in the Institute represents a minimum of seven years of systematic training and experience.

Mr. Biffen has written widely for technical journals. His most recent scientific publication is a book *Commercial Methods of Analysis* written in collaboration with Dr. Foster Dee Snell for early publication.

◆

▶▶▶ The employees of Sorg Paper Company, Middletown, Ohio, gave a testimonial dinner on June 1 honoring *J. A. Aull,* who has been president of the company. Mr. Aull has become chairman of the board, and is succeeded as president by *Donald G. Driscoll,* who has been executive vice president.

◆

M AND O RE-ELECTS OFFICERS & DIRECTORS

All officers and directors of Minnesota and Ontario Paper Company, Minneapolis, were re-elected at meetings of the stockholders and the board of directors held May 22.

The officers are: President, R. H. M. Robinson; senior vice president, R. W. Andrews; vice president, C. T. McMurray; vice president, R. J. Henderson; secretary and treasurer, R. D. Main; comtroller, Frank J. Hickling.

◆

▶▶▶ New advertising manager of the American Brake Shoe Company, New York City, is *Robert H. Ramage,* who has been associated with the company since 1936. Since 1939, he has been editor of the *Brake Shoe News,* an employee magazine.

◆

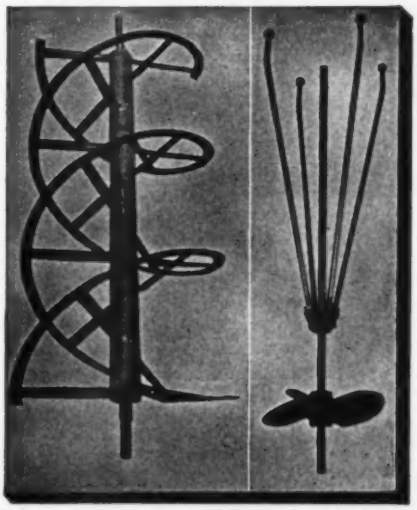
▶▶▶ Pacific Mills, Limited, of Ocean Falls and Vancouver, British Columbia, announces the appointment of *Hugh Hodgins* as head of its new department of forestry. As an important part of a long-range program, this company is placing its forest holdings in British Columbia on a managed basis that will assure adequate supplies

DID YOUR AGITATION SYSTEM "just grow" (LIKE TOPSY?)

..OR DID YOU PLAN IT?

Did your agitation system grow up like Topsy —or did you plan it? The Shartle contention is that an agitation system should be carefully engineered and that mills that disregard that fact are making a serious mistake. Other things are planned. Why not agitation?

Being designers of both circulating and paddle type systems, Shartle engineers are free of bias—can and do prescribe the type system that best fills the bill. Having no "pet" system to promote, their recommendation is impartial—based solely on type of stock, design of chests, mill layout and any other vital factors that may be present. Consult Shartle Engineers on agitation.



AGITATION—ANY TYPE • CHESTS—ALL KINDS • PUMPS—FULL LINE

SHARTLE BROS. MACHINE CO.,

MIDDLETOWN, OHIO

Dilts

Dilts Machine Works, Fulton, New York.
Divisions of Black-Clawson Co., Hamilton, Ohio.

of pulpwood for its substantial operations. Work of the department will include wood utilization, studies on timber growth, silviculture, and sustained yield planning. Mr. Hodgins is a University of British Columbia graduate who has been 16 years with the forest branch.

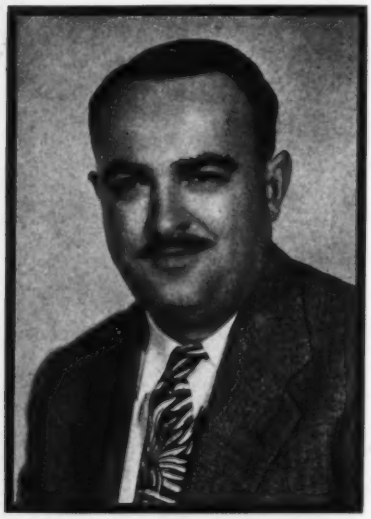
◆

DETREX CORP. CHANGES PERSONNEL AND OPENS NEW MIDWEST OFFICE

The following changes in personnel have been announced by Detrex Corporation, Detroit, Michigan.

Leroy Camel, previously manager of the Eastern section of the Alkali Division, has been promoted to sales manager of the Alkali Division.

R. W. Pflug, previously manager of sales and service in the North Central Region, has been made manager of the company's Central Region territory,



Leroy Camel

which comprises the states of Michigan, Ohio, Indiana, Kentucky, and West Virginia.

The company also announces it has enlarged two eastern sales and service offices and added another in the midwest. The new office for Indiana territories is in Indianapolis; Charles M. Munns is the division manager in charge.

◆

▶▶▶ At a postponed meeting, the Brown Company, Berlin, New Hampshire, re-elected *Frederic G. Coburn,* president. All of the directors of the Brown Company and the Brown Corporation, its Canadian subsidiary, were re-elected with the exception of *R. H. Marshall,* comptroller, who has resigned. He is succeeded by his former assistant, *R. R. Norwood.*

DON McDOWELL LEAVES KVP — WITH CENTRAL PAPER CO., MUSKEGON

After twenty-one years with the Kalamazoo Vegetable Parchment Company, Parchment, Michigan, recently personnel director, Don E. McDowell has resigned and become personnel director of the Central Paper Company, Muskegon, Michigan.

Mr. McDowell quit the Oakland Four, a nationally-known quartet, twenty-one years ago to become associated with KVP as payroll clerk. He became successively assistant employment manager, employment manager, and finally personnel director.

◆

▶▶▶ Until recently engaged in consulting and advisory activities for the chemical industry, *Dr. Eugene McCauliff* has now become associated with the Glyco Products Company, Inc., Brooklyn, New York, as technical sales director. In his consulting work, Dr. McCauliff initiated many process developments and designed chemical pilot plant and production installations. In some of his work he acted as technical director of sales for the Duff Chemical Company, New York City. An earlier connection was with the sales department of the Hooker Electrochemical Company.

◆

ANDERSEN EXECUTIVES ELECTED BY PULP AND PAPER TRADING CO.

New officers of the Pulp and Paper Trading Company, New York City, are: President and Treasurer—Morris Gintzler; Vice President, in charge of the Pulp Division—Frederick Swanson; Vice President, in charge of the Paper Division—Frank E. Forsbrey; Secretary—Jordan S. Tucker; Assistant Vice President and Assistant Treasurer—Joseph L. Fox.

Mr. Gintzler is an executive and part owner of J. Andersen & Company; Mr. Swanson is general manager of that company.

◆

NATHAN MARSH PUSEY NEW PRESIDENT OF LAWRENCE COLLEGE

For seven months, the affairs of Lawrence College, Appleton, Wisconsin, have been under the direction of Ralph J. Watts, business manager. Last November, the former president, Thomas N. Barrows, resigned due to ill health.

On July 1, Nathan Marsh Pusey will take over the office of president, his election to that office having been announced following the annual meeting of the board of trustees.

Dr. Pusey comes to Lawrence from Wesleyan University in Connecticut where he has been a member of the faculty. He was sophomore tutor at Lawrence from 1935-1938. Dr. Pusey is the fourth successive president of Lawrence College to take office between the ages of 36 and 38.

(The Institute of Paper Chemistry is connected with Lawrence College.)

◆

WARREN STEAM PUMP ANNOUNCES CHANGES IN BOSTON OFFICE

Changes in the personnel of its Boston office, effective June 1, are announced by Warren Steam Pump Company, Inc., Warren, Massachusetts.

Howard C. Fiske, well known among New England pumping machinery men and forty-five years with

Parkman A. Collins

the company, will retire as manager of the Boston office, but will remain a director of the company, an office held by him since 1926.

The new Boston manager is Parkman A. Collins, who has been associated with Mr. Fiske for the past twenty years. Mr. Collins is a graduate of the University of Maine. He served in World War I, and his first business connection was with New York Belting & Packing Company. In 1925 he gave up that connection to join the Warren organization. He has had wide experience in the various industries including pulp and paper mills.

An addition to the Boston office personnel is Harold Fox, who has been with General Electric Company since 1927. For many years he was New England district specialist on pumping applications and oil refineries.

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WAX EMULSIONS

The only liquid needed is water

The Paracol* Wax Emulsions pour or pump like water at all mill temperatures. They mix perfectly, offer trouble-free handling in beater, tub, calender or coater. Stable on long storage, they are formulated to break only where and when the wax is needed . . . in the presence of acid or alkali or heat. It's easy to use Paracol whenever paper needs wax.

Your PMC technical representative knows how to obtain the best results with Paracol—through our more than 15 years experience in making emulsions and applying them to papermaking problems. For further information on the use of Paracol emulsions in your operations, use the convenient coupon below.

● **WHAT HAPPENS HERE?** Paracol is mixing with water like cream in your coffee—hot or cold. The wax particles of Paracol Emulsions are so microscopically small that they disperse quickly and uniformly in water solutions of papermaking materials.

HERCULES

CHEMICALS FOR INDUSTRY

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Paper Makers Chemical Department
961 King Street
Wilmington 99, Delaware

Gentlemen:

My wax problem is.....

Please send me information on.....

Name.....Title.....

Firm.....

Address..... PI-44

ENGELSMAN PROMOTED BY METALLIZING CO.

The appointment of Henry D. Engelsman as sales manager and technical service supervisor is announced by the Metallizing Company of America, Chicago.

Mr. Engelsman has been associated with the company for two years as

Henry D. Engelsman

sales and service engineer. Prior to that time, he was employed by The DeVilbiss Company as a sales and service engineer.

◆

▶▶▶ Until recently sales manager of the Swenson Evaporator Company, Harvey, Illinois, *L. L. Malm* has now joined the technical staff of Industrial Rayon Corporation, Cleveland, Ohio. Mr. Malm has spent twenty years in chemical engineering, production, and development work in this country and in South America. He is a member of TAPPI, the American Institute of Chemical Engineers, and the Chemists' Club of New York.

◆

SILVER RESIGNS AS MILL MANAGER OF BOWATER'S

The resignation of Frank Silver, mill manager of Bowater's Newfoundland Pulp and Paper Mills, Corner Brook, Newfoundland, became effective May 3. His future plans have not been announced. Mr. Silver was mill manager in the 1930's, when the International Paper Company operated the Corner Brook mill, and when Bowater's acquired the plant, he was continued in that capacity by the English company.

Gerald Penney, mill superintendent, has been promoted to general mill superintendent and will take over the duties previously assumed by Mr. Silver. Mr. Penney has been associated with the Corner Brook mill since its beginning in 1927.

◆

▶▶▶ At the annual meeting of The Wm. Powell Company, Cincinnati, Ohio, five additional vice presidents were elected: *Wm. R. Kraus, Wm. E. Minor, Harry C. Morine, E. K. Pierce,* and *E. W. Voss.* Wilton Husing was elected assistant to the president. All other officers were re-elected.

◆

▶▶▶ Many years of experience in the pulp and paper industry is the record of *James H. Perry,* who has been appointed technical engineer in the pulpstone division of the Norton Company, Worcester, Massachusetts. Mr. Perry will be responsible for engineering and sales work on the Norton pulpstone.

◆

MONSANTO ANNOUNCES PERSONNEL CHANGES

The Monsanto Chemical Company, St. Louis, Missouri, recently announced several changes in production personnel.

E. A. O'Neal, Jr., who has been plant manager of Monsanto's Trenton (Mich.) plant since September, 1940, has been promoted to the position of production manager of the Phosphate Division, with headquarters at Anniston, Alabama. He succeeds Felix N. Williams, recently named general manager of the company's Plastics Division at Springfield, Massachusetts.

James A. Wilson, assistant plant manager of the Trenton plant since 1942, has been named plant manager to succeed Mr. O'Neal.

◆

▶▶▶ The new chairman of the Kalamazoo Section of the American Chemical Society is *Dr. Fred L. Chappell, Jr.,* of the Paper Makers Chemical Department of the Hercules Powder Company. In 1941 and 1942, Dr. Chappell was chairman of the Kalamazoo Valley Section of TAPPI.

◆

▶▶▶ The resignation of *Russell L. Winget,* administrative assistant of the American Paper and Pulp Association, has been announced as of June 1. Mr. Winget has become executive secretary of the National Council of Stream Improvement, Inc., of the Pulp, Paper and Paperboard Industry. (See page 284.)

J. E. UNDERWOOD IS DIAMOND ALKALI'S NEW DIRECTOR OF RESEARCH

The appointment of J. E. Underwood as director of research has been announced by Diamond Alkali Company, Painesville, Ohio.

Prior to this new connection, Mr. Underwood was associated with the WPB Office of Production Research and Development. He also has been associated with the Mellon Institute of Pittsburgh, U. S. Bureau of Mines, Radium Company of Colorado, Radium Emanation Corporation, National Lime Association, and the Pennsylvania Salt Manufacturing Company.

Mr. Underwood will have his headquarters at the Diamond Research Laboratories in Painesville.

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▶▶▶ The Controllers Institute of America has elected to membership *Donald Turner, Sr.,* chief accounting officer of the Pollock Paper & Box Company, Dallas, Texas, and *Robert L. Stormes,* assistant controller of the Oswego Falls Corporation, Fulton, New York. The Institute is a technical and professional organization of controllers devoted to the improvement of controllership procedures.

◆

▶▶▶ Aboard a submarine-net-tender, somewhere in the Pacific, *James G. Whiting,* president of Collins Manufacturing Company, North Wilbraham, Massachusetts, is serving as a boatswain's mate second class. Mr.

James G. Whiting

Whiting enlisted in the Navy in May, 1942. He was a well known yachtsman before his enlistment, and his 40-foot cruiser is now laid up at Cape Cod.

RADIAL LOAD ONLY

Compound Loads Can't "Pile-Up" Beyond Rated Load Limits . . .

Because

ROLLWAY RIGHT ANGLE LOADING Splits the Load

into pure radial and pure thrust

You never have to worry about combined radial and thrust loads piling up on a single bearing when installing Rollway Roller Bearings. Because with Rollway's right-angle loading, there just isn't any such thing—a radial bearing carries the radial load, and a thrust bearing carries the thrust load. Or, if there's just one load—either radial or thrust—you use just one bearing. It's as simple as that.

Naturally, the magnitude of either the thrust or radial load component is smaller than the combined magnitudes of the two. Thus, you get a capacity margin you frequently can use either for a heavier load, a higher shaft speed, a longer life expectancy, or a proportionate combination of all three. Or you can cut down on the size of the housing and use a smaller size bearing. Whichever you choose to do, you'll find that Rollway gives you a better run for your money . . . that it simplifies and standardizes your bearing problems.

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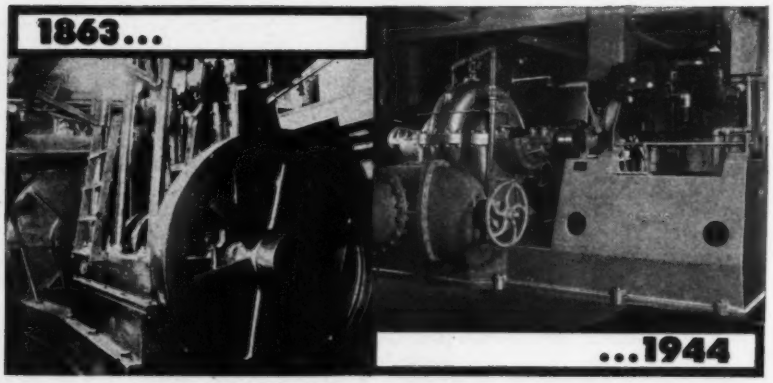
S.A.E. or American Standard metric dimensions and tolerances in a wide range of sizes and types assures low cost and ready availability for most applications. Let our engineers assist you in selecting the types best suited to your needs. No charge or obligation. Just send drawing or detailed description.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 — BEARINGS



EXPERIENCE – important ingredient of good packings

THIS IS THE **7th** of a series explaining why G-T PACKINGS give better service.

8 REASONS for the Superiority of G-T Packings

1. **SIMPLE LINE** . . . makes correct selection easy
2. **COMPLETE LINE** . . . an exactly suitable type for every service.
3. **SELF LUBRICATING** . . . each individual strand saturated with lubricant
4. **SPECIAL LUBRICANTS** . . . lubricant for each service specially compounded in our own plant
5. **SELECTED YARNS** . . . provide tensile strength and resist high temperature
6. **CONSTRUCTION** . . . assures maximum endurance, longest life, lowest friction
7. **EXPERIENCE** . . . 80 years of manufacturing experience
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You cannot see or feel the experience that goes into the manufacture of the packing you buy, but this factor is an essential element in its life, service, and ultimate cost.

An experience of more than 80 years is part and parcel of every G-T Packing. This experience means "know-how" in making packings . . . it means that you get precisely the right yarns and lubricant for your particular service, fabricated into a perfectly made packing which effects the tightest seal, over the longest period, with the least amount of frictional wear of the equipment.

An actual trial of PALMETTO or one of the other G-T Packings is the most convincing demonstration of what the 80-year G-T knowledge can mean to you. Hundreds of Engineers have made such a trial, with the result that most of them have standardized on these low-friction, long-life packings. Select the correct grade of G-T Packing from the list below and make your own test . . . under your own conditions. Your distributor can supply you.

GREENE, TWEED & CO.

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PLANTS: New York, N. Y. and North Wales, Pa.

PALMETTO for steam, hot water, air. PALCO for water. PELRO for oils. CUTNO for alkalis. SUPERCUTNO for acids. KLERO for foods, etc. PALMETTO SUPERSHEAT PACKINGS

G-T *self-lubricating* **PACKINGS**

Necrology

▶▶▶ Assistant comptroller of the Menasha Products Company, Division of Marathon Paper Mills Company, Menasha, Wisconsin, *E. H. Lewandowski,* passed away suddenly in Chicago May 18. He had been connected with the Menasha company since 1912, except while serving in World War I.

◆

▶▶▶ The War Department has notified James B. Leonard, superintendent of the International Paper Company's plant at Ticonderoga, New York, that his son, *Edward Leonard,* a second lieutenant, was killed in Italy early in April in a vehicle accident.

◆

▶▶▶ For many years president of the J. O. Ross Engineering Corporation New York City, *Alfred B. Clark* passed away May 27. He was widely known throughout the heating, ventilating, drying and air conditioning industries and had been associated with the Ross corporation since 1921 when the business was founded.

◆

▶▶▶ *Harvey D. Humphreys,* manager of the Sorg Pulp and Paper Company's plant at Port Mellon, British Columbia, passed away suddenly while on a business visit to Vancouver.

◆

▶▶▶ Among the men reported missing following the sinking of H. M. C. Frigate "Valleyfield" on North Atlantic convoy duty is *Lieutenant G. A. MacLachlan,* 22, son of Commander and Mrs. K. S. MacLachlan. Commander MacLachlan, who was formerly president of Fraser Companies, has been with the Department of National Defense, Navy, and with the Royal Navy since practically the beginning of the War.

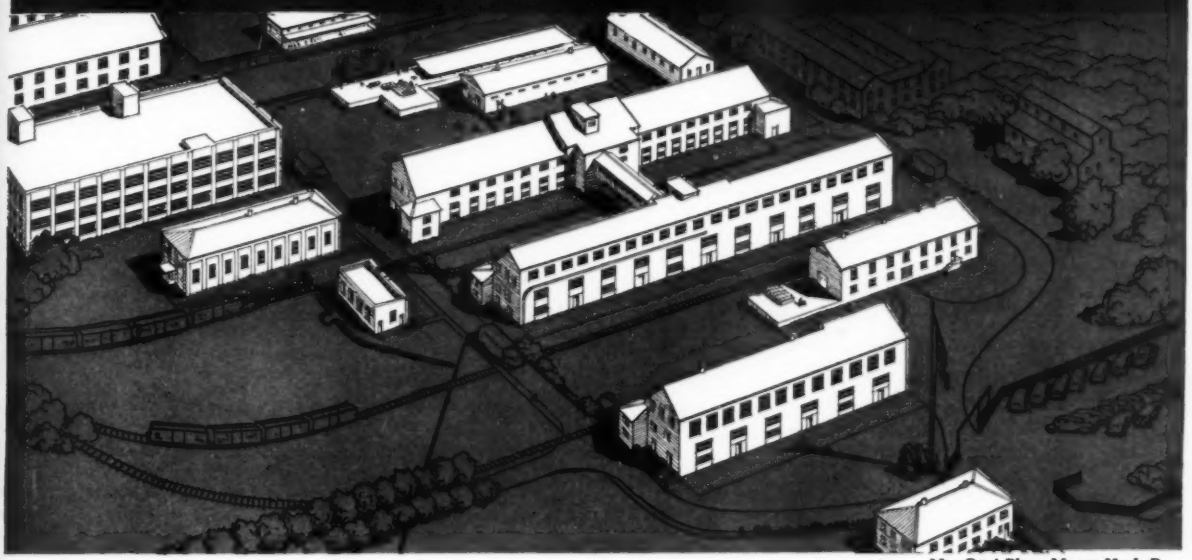
◆

▶▶▶ In his twenty-fifth year with the Paterson Parchment Paper Company, Bristol, Pennsylvania, *Charles H. Cashmore,* president, passed away May 26 at the age of 67. He was born in New Britain, Connecticut, and educated at New York University.

◆

▶▶▶ *John W. Nunn,* managing director of the Vancouver Pacific Paper Company, Limited, died in Toronto recently at the age of 63 while on a business trip. Mr. Nunn had been associated with the Vancouver Pacific Paper Company for 13 years.

AGAIN *GENERAL CHEMICAL* CREATES NEW FACILITIES FOR BAKER & ADAMSON PRODUCTS TO SERVE AMERICAN INDUSTRY!



New B&A Plant, Marcus Hook, Pa.

THESE NEW FACILITIES for production of Baker & Adamson reagent and fine chemicals provide ideal manufacturing areas, additional research and development laboratories, and special storage and shipping accommodations. This plant's output, coupled with that of other Baker & Adamson producing units and distributing stations throughout the United States, marks another forward step in Baker & Adamson leadership.

Basic materials for many Baker & Adamson quality products made here come directly from sixteen of General Chemical Company's producing locations. With such fundamental sources of supply, including many Company-owned mines for raw materials, Baker & Adamson is in a pre-eminent and unique position for meeting the expanding uses of high-purity chemicals in industry.

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Fine Chemicals for Industrial America

THEY'RE TOUGH... THESE 125 lb. GATE VALVES

And they're proving it...in exceptional lasting qualities...in dependable performance under trying conditions...in less attention and fewer repairs...in short, in all the ways that add up to better service and a saving of time, labor and expense.

The extra strength built into these tough bronze valves comes in good stead in withstanding the punishing demands of continuous operating schedules. The simplicity of design and precision interchangeability of parts makes servicing easy and speeds maintenance.

Figures 2125 and 2129 (illustrated) are typical examples of Lunkenheimer correct engineering—carried through in a complete line of bronze, iron and steel valves, for all prevailing pressures and temperatures. Catalog available on request.

Lunkenheimer products are available from distributors everywhere. One of these distributors is near you to assist you with your maintenance and operating problems. His complete facilities and wide experience are at your call.

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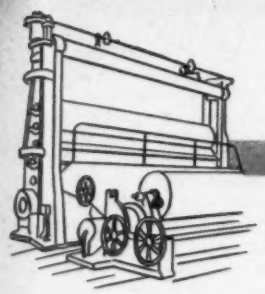
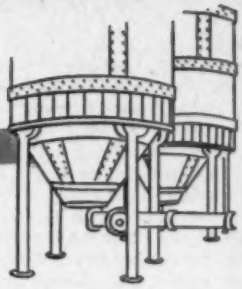
LUNKENHEIMER VALVES



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Putting Seam in Dryer Felt

Some years ago, all that was required in putting a seam in a dryer felt was to do it in a manner that would hold both ends of the felt together and would not cause the felt to run into a wrinkle. The practice was to superimpose or overlay one end of the felt upon the other and then to tack the two thicknesses to a board or wire pole which was positioned under and across the felt a little over two inches back from the ends. In this position, a seam was hand-stitched in the felt close to the outer edge of the board. Coarse thread was used for the joining; and the sewing was done with a sail needle.

With the development of faster operating machines, such a seam proved unsatisfactory. In the first place, the paper made on a high speed machine was not as dry upon reaching the dryer section as on a slower operating machine. Then the felt had a tendency to slip. This combination of conditions together with the flap of the seam being next to the paper often caused a felt to mark the paper.

To overcome this trouble, sewing machine stitching was substituted for the hand stitching and the flap was put on the outside of the felt. This seam proved very satisfactory but it is rather difficult to put in a dryer felt.

Probably the most recent type of seam to be developed, and also the most popular, is the blued or cemented seam.

The job of putting in a seam is much the same no matter what the type.

The automatic stretch roll is hooked back. The stretch is slackened its entire length. Where there is a hitch or reef roll, it is set back in another box. As much of the felt as possible is taken out prior to making the seam.

When the seam in a felt is crooked, all cross threads conform more or less to the same pattern. In shortening such a felt, the cut should not follow the pattern of the crooked seam. The cut should be made just as it would be in a felt with a straight seam; namely, to form a perfect rectangle.

Usually the rectangular strip is cut out in the vicinity of the seam, the old seam being embraced in the strip.

To cut this strip straight, distances should be measured from some fixed place on the machine frame, or from one of the felt rolls that is correct as to line and distance, and the dryer felt marked through the help of a chalk line or a straight edge. The marking serves as a guide in cutting the felt in two.

After this cut has been made, the felt is pulled up or over as the case may require and the distance to be cut out measured off on each side of the end of the felt that is to be shortened. The strip to be removed, unless the machine is very narrow, will be in the shape of a rectangle.

The trick is to cut a perfect rectangle. If a perfect rectangle is obtained, the seam will run without being followed by a wrinkle. If the ends of the piece that is removed are not of equal length, a wrinkle is bound to follow the seam.

If a seam is to be made by hand, it is advisable to mark the felt where the seam is to go. A lead pencil mark at each edge about two inches in from the end will serve as a guide.

The needle used for making the seam

Pipe Vises for Brass Pipe

The pipe vises used in brass pipe work may be those commonly used in iron pipe work. It is not necessary to purchase special vises for brass pipe. It is advisable, however, to have a set of friction clamps to protect the pipe from the teeth of the vise. These clamps either can be purchased or made. A set will last a long time.

A homemade form is shown in Figure 1. A common steel pipe coupling is sawed in halves. Then each half is lined with a piece of 6 or 8 lb. sheet lead, this being squeezed into the coupling threads by screwing down the clamps and lead pieces tightly over a piece of brass or iron pipe in the vise, then beating the edges of the lead over the iron half-coupling, substantially as shown. The coupling threads penetrate the sheet lead and help to hold it firmly in place. The lead lining thus fits snugly around the pipe, making a large bearing area which holds by friction, not by teeth cutting into the brass.

Figure 2 illustrates a piece of brass pipe held firmly in a pipe vise by such a clamp. The jaws are screwed tightly on the clamps and the lead holds the pipe by friction. To prevent the pipe from slipping in the clamps, the lead linings may be sprinkled with powdered resin before the pipe is set in them. The resin makes the lead grip the pipe firmly and still does not cut into it.

Factory-made clamps similar to Figure 3 are better. They are stronger and do not spread like the kind shown in Figure 1. They hold firmer and last longer and, therefore, are preferred by most mechanics.

Any resin that sticks to the pipe can be dissolved and washed off with a rag moistened with alcohol or gasoline. Alcohol is quicker in action. Thus in all respects, except the placing of friction clamps in the vise, the operation is the same as in iron pipe work.—COPPER AND BRASS RESEARCH ASSOCIATION.

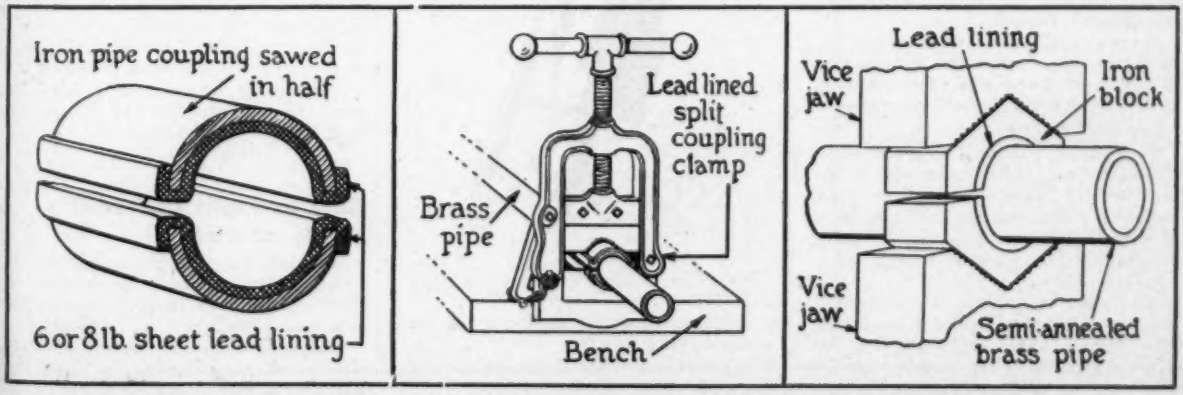


Fig. 1 (left)—Friction clamp. Fig. 2 (center)—Friction clamp in use. Fig. 3 (right)—Detail of friction clamp.

should be threaded double, thus giving four threads. The total length of the thread as ready for sewing should be about six feet. Too long a thread is a hindrance in stitching.

No knots in the thread should contact the sheet. Therefore, stitching is started on the back side of the seam and in the middle of the felt. The thread, however, should not be drawn through the felt to the end. Rather about seven inches of the thread should be left for tieing in the thread for the other half of the felt.

If sewing to the right, the needle should next be entered about two inches to the left of the first stitch. After the thread has been drawn through the felt and all the slack taken out of it, the needle is inserted about four inches to the right of the first stitch. Then the next stitch is made two inches to the left, followed by a stitch four inches to the right, and so on across the right half of the felt.

When near the edge, about an inch or so, an extra stitch should be put in. No stitches should be made around the edge of the felt, They only would be worn off by a felt guide or anything else that might chafe the felt edge.

When necessary to rethread a needle, enough of the old thread should be left extending from the back side of the seam to permit tieing of the new thread to it. All knots must be kept on the back side of the seam. Otherwise, they will mark the sheet, if they contact it.

To fasten the thread at the edge of the felt, a knot is sewed into one of the immediate stitches, again on the back side of the seam to prevent possible marking of the sheet.

In sewing the left half of the seam, the thread is tied to the protruding end of thread left in making the first stitch. The tie must be short. Then a stitch is made four inches to the left, followed by a stitch two inches to the right, and so on until near the left edge when the thread is tied off in the same way as already described.

Such a seam has twice as much thread on the back side of the flap as on the front side. That is as it should be. Likewise, there should be no slack threads; they cause trouble.

With the seam completed, the tacks are pulled out of the board or pole, the board or pole removed, the stretch tightened, and the tightener released.

In making a seam with a sewing machine, the felt is cut in the same manner as for a hand sewed seam. Then the ends of the felt are tacked to a board upon which the sewing machine runs.

To make a cemented or glued seam, the felt is cut in the same way as has been outlined. Then one end of the felt is tacked to a flat board and the cement or glue applied to the unprotected surface after it has been brushed with a coarse metallic brush.

The other end of the felt is brushed and cement or glue applied to it in the same manner. Then, after allowing the adhesive to set for a few minutes, the two glued or cemented surfaces are brought together, tacked down and ironed with a hot flatiron. Following these operations, another board is nailed on top of the seam to hold it together until the adhesive hardens.

A cemented or glued seam may be reinforced on the ends with a few rivets.

The glued or cemented seam is used to avoid markings. Yet such a seam cannot be absolutely smooth. There must be a jog in the felt at the point of joining. Therefore, the lap that is on the top side, contrary to usual practice, should have its end pointed in the direction in which the felt runs.

Sight must not be lost of the fact that the paper hauls the dryer felt. If the dryer felt slips and the lap is not in the direction of felt travel, the paper rubs against the lap rather than passing off the end of the seam. A situation of this kind is conducive to the marking of the sheet.

Riveted seams are also used for joining the ends of dryer felts. In this case, a seam is made by marking a flap about four inches wide and then putting in three rows of rivets.—ARCHIE MCCAFFERY.

◆

Working from Ladders

Avoid falls by observing these and other safety suggestions:

1. Make sure the ladder is without defects, and is placed securely against solid backing at a safe angle of about 75 degrees with the horizontal.

2. Clean mud or greasy substances from your shoes before climbing up to work.

3. Face the ladder and hold on with both hands whenever climbing up or down.

Courtesy National Safety Council

Carry tools in suitable pockets, or hoist them with a rope.

4. Work facing the ladder and hold on with one hand.

5. Use a safety belt if the character of the work requires it.

6. It is dangerous to reach out too far from a ladder in any direction; move the ladder as the work may require.

7. Avoid the use of two ladders spliced together; get one long enough to reach the job.

8. It is unsafe to use a ladder as a horizontal member of a scaffold.

9. When using ladders on roofs or other high places, lash them securely. Do not work in a high wind. Safety Instruction Card No. 324, NATIONAL SAFETY COUNCIL.

◆

Tool Control

One of the mistakes that management commonly makes is disregard of tool control. It can be costly. Now as never before, a tool *saved* is a tool *earned*.

Tools are a valuable investment in your plant today and extremely difficult to replace due to material shortages and the lack of skilled workmen to produce new tools. With the unusual demand upon tools and their use by new and inexperienced operators, tool control is a necessity. Tools should be preserved. They should be guarded against loss. They should be kept in working shape and handled carefully. Proper tools are necessary for quality manufacturing. They govern the speed of the work to be accomplished and have a direct influence on factory costs.

Lack of tool control, or inefficient administration of control measures adopted, results in loss of worker's productive time, idle machine hours, production delays, increased defective production, higher production costs and excessive investment in costly material.

When plant executives really begin to evidence concern over tool expense they usually proceed to have an all-over plant inventory of tools taken. This inventory too often reveals the fact that many tools are lying here and there throughout the plant and not being put to use. A number of these may be just the tools a worker needs for a particular job. But upon calling at the tool crib, he is told the tool is "out of stock." There being no record of tools charged out, or of their activity, someone orders more of that particular tool, building up an excessive inventory. That is lack of tool control. In many actual cases when a factory-wide tool inventory has been taken, engineers have found that three times as many tools were on hand as were necessary.

Take such an inventory in your own plant. It will be illuminating. It will show you what lack of control has done for you and *where* some of your profits have gone.—From Report No. 150, GEORGE S. MAY BUSINESS FOUNDATION.

◆

How to Fight Different Kinds of Fires

Most incipient fires can be put out in a fraction of a minute, if the extinguisher operator knows how to use his equipment to best advantage.

In fighting a fire in ordinary combustibles (wood, paper, textiles, etc.), the extinguisher stream should be aimed at the base of what is burning, and not at the

smoke and flames. Application should be continued until the fire is completely out. Then the operator should search the remains for glowing embers and drench thoroughly any that he finds.

Fires in flammable liquids generally fall into two categories—those in containers of liquids, and those in spills. If a foam, vaporizing liquid or loaded stream extinguisher is used, the operator should play the extinguisher stream against the far inside wall of the container just above the burning surface. This will avoid splashing and permit a natural spread of the extinguishant back over the burning surface. Where possible, the operator should walk around the container while directing the stream, so as to get maximum coverage during the discharge period. Where an operator using a foam or loaded stream extinguisher must remain at a considerable distance from a container of burning liquid, the extinguishant, directed at a high angle, may be allowed to fall lightly on the burning surface. In no case, however, should the stream be directed into the burning liquid.

If a carbon dioxide extinguisher is used, best results can be obtained by directing the discharge as close to the burning surface as possible, starting nearest the operator and then progressing forward, moving the discharge horn slowly from side to side. The discharge should be continued even after the flames have been extinguished, to cool the liquid and prevent a possible reflash.

In fighting fires in spills, the operator should put out the flames nearest him first, and then slowly sweep out the fire as he advances along its path.

Fires in electrical equipment should be fought the same way as those in ordinary combustible materials. If vaporizing liquid or carbon dioxide extinguishers are used, the operator can advance as close to the fire as necessary before the current is turned off—though best practice is always to turn off the current first. If water or water solution extinguishers are used (though they are not recommended for fires in electrical equipment), the equipment must be made electrically dead before application begins; otherwise damaging short-circuits can result and, if the voltage is high, a harmful charge may travel up the hose stream to the operator.

A few general safety rules should be kept in mind. The operator should stand as far from the fire as conditions, and effective use of the extinguishing agent, will allow. In the case of a 2½-gallon soda-acid extinguisher, the effective horizontal discharge length is from 30 to 40 feet; in that of a 15-pound carbon dioxide type, about six feet. The operator should maintain his position between the fire and an exit to permit ready escape; and, if the fire is outdoors or in the path of a strong draft, he should stand to windward (his back to the wind). As soon as the fire is out, the area should be thoroughly ventilated.—SAFETY RESEARCH INSTITUTE, INC.

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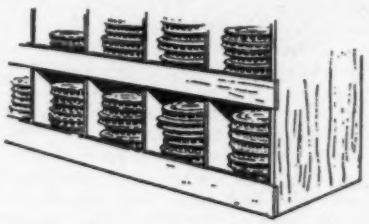
Chain Belt Storage

If a drive is to be idle for considerable time, remove the chain, thoroughly flush and cover it with a heavy lubricant. Don't drag the chains across floors or leave them hanging or lying exposed where they may collect dirt and grit.



Wrap them securely and put them away in storage bins. Or, if you prefer, chains can be left submerged in a pail of oil. Bulletin No. 435, THE CHAIN BELT COMPANY.

◆

How to Cut Braided Flexible Metal Hose and Tubing

Before cutting braided flexible metal hose or tubing to the desired length, it is good practice to spot the section to be cut with solder. This procedure prevents the braid from unraveling.

To carry out the soldering operation, place the tubing in a horizontal position and daub on enough flux to the cutting point to permit solder to flow around the hose or tubing, using a minimum at all times. Then heat this point with a soldering iron and apply the solder, rotating the hose or tubing while doing so to obtain an even surface. Spotting also can be done by pouring molten solder over the fluxed portion.

If illuminating gas, gasoline or acetylene flame is used for heating, caution should be exercised to not overheat the hose or tubing.

After spot soldering, the hose or tubing is ready to be cut. The cutting can best be accomplished by using a standard hack saw and a wood block. The block should have a v-shaped trough cut into its upper surface, and the full length of it. It also should be slotted vertically from the top in the cross direction to the depth of the bottom of the trough.

In making the cut, the hose or tubing should be placed lengthwise in the trough with the soldered section centered with the vertical slots which serve as a guide for the saw. Then the cut can be made.

A metal cutting band saw might be used to cut flexible metal hose or tubing; but a power hack saw should never be used since its weight might crush the hose or tubing out of round.

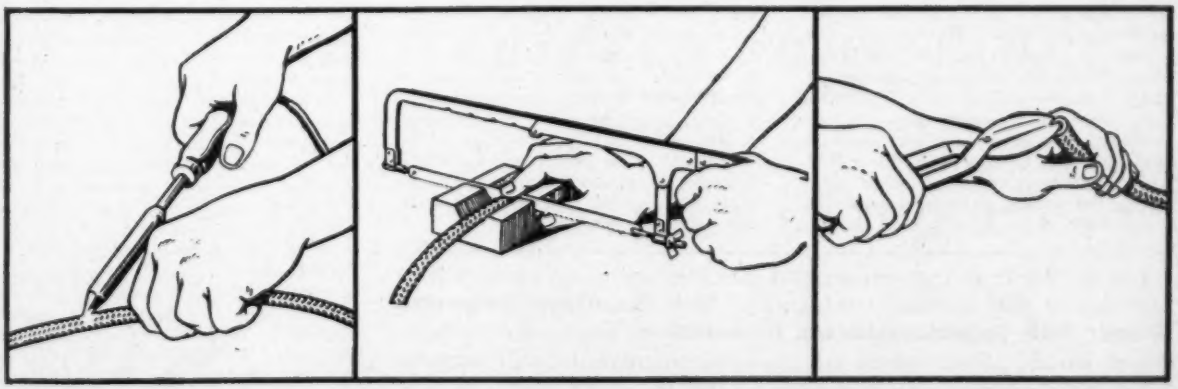
After the cut has been made, the loose strip of metal from the inside circumference of the hose or tubing should be cut away with tin shears or any sharp metal cutting tool. Then, any burrs, formed by the cutting operation, should be removed from the outside circumference with a file.—Adapted from data of TITEFLEX INC.

◆

Keep the File Cutting

One of the quickest ways to ruin a good file is to use too much pressure—or too little—on the forward stroke. Different materials, of course, require different touches; but, in general, just neough pressure should be applied to keep the file cutting at all times. If allowed to *slide* over the harder metals, the teeth of the file rapidly become dull; and if they are "overloaded" by too much pressure, they are likely to chip or clog.

On the reverse stroke it is best to lift the file clear off the work, except on very soft metals. Even then the pressure should be very light—never more than the weight of the file itself.—NICHOLSON FILE COMPANY.



Left—Spot soldering hose in preparation for cutting. Center—Cutting with a hack saw and Vee block. Right—Trimming.

Convention Papers . . . Abridged

The Chicago Plan of Waste Paper Salvage

JOHN R. ROBINSON, Representing Chicago Newspaper Publishers' Association

I believe you will agree with me that the waste paper consuming mills, the War Production Board and the Office of Civilian Defense bogged down during the first waste paper salvage campaign. In fact, these three organizations fell down to such an extent that Donald M. Nelson, very late in 1943, asked the American Newspaper Publishers' Association to take over the task of spearheading waste paper campaigns and drives in every section of the country. Obviously, Mr. Nelson would not have enlisted the aid of the newspapers had the other three groups been able to function properly. The newspapers of America are spending more money today than the War Production Board, the Office of Civilian Defense and the waste paper consuming mills put together. This applies to almost every metropolitan area in the country and to a lesser extent in the smaller cities and towns.

Shortly after the publishers of Chicago's six English-language newspapers came into the picture to spearhead the midwestern campaign, six promotion officials of the six newspapers formed a salvage and publicity committee. I was elected chairman of this committee and under a mandate to work full-time and perfect the Chicago organization through establishing harmonious relations with all other bodies interested in salvaging waste paper in the midwest and particularly Chicago.

One of my first requests was to the waste paper consuming mills in the midwest, through the president of the board manufacturing group, Mr. William Beckwith of the Morris Paper Company, Morris, Illinois. A committee was appointed to establish an independent office in Chicago, this office to be used as co-ordinating headquarters for all waste paper salvage activities in the midwest. My original understanding was that a manager of this office would be appointed, with one, possibly two assistants.

An exceedingly competent waste paper man, Joseph E. Marcus, was detached from his regular business by the U. S. Paper Supply Company, his employers, and detailed to manage this office. Mr. Beckwith, Mr. Arthur U. Claghorn, Mr. A. H. Meisterheim, and Mr. William Bennett solicited the funds from the various mills. The board mills responded enthusiastically

Now, let me go off on another angle for a minute. Our Chicago Waste Paper Salvage Committee, spearheaded by the newspapers and working in close harmony with the Chicago Board of Education and the elected and appointed city officials of Chicago, is generating many thousands of tons of extra tonnage of waste paper every month. A good percentage of this is wood-free stock used by the big book paper mills and to a lesser degree, a fair percentage of the paper is generated for use in the bond paper mills. This extra tonnage has been produced to a very large extent by the publicity given the campaign by our six Chicago newspapers and by the wholehearted support given us by the Board of Education and Mayor Edward J. Kelly of Chicago.

I will now speak solely for the newspaper publishers of Chicago. Inasmuch as this extra tonnage has been produced largely through our efforts and at our expense, a general feeling is becoming prevalent among the publishers and their executives that we have a definite responsibility in seeing that this paper gets to the proper mills. We also have a definite right in the destination of this tonnage which we generate. I cannot, of course, speak for the City of Chicago, but I have no doubt that city officials, when the matter is presented to them by us, will feel exactly as we do.

Our board paper mills in the midwest are working on an average of a ten-day inventory. Our book paper mills, on the other hand, are in excellent waste paper inventory condition. This condition of the book mills inventory is largely due to the wood-free stock which they are receiving from the Chicago area and which we are generating at our expense and also at the expense of the board mills.

These book paper mills have consistently refused to stand their share of the expense.

Three exceptions are made to this statement.

The Bergstrom Paper Company, Fort Howard Paper Company, Wisconsin mills who receive practically no waste paper from the City of Chicago and Champion Paper Company of Hamilton, which receives very little, all are contributing. They contribute on the basis that while they receive very little paper from Chicago, the generation of extra tonnage in Chicago will aid the overall waste paper situation.

I do not know just what the future will bring forth in this situation. We are badly in need of a field man to aid Mr. Marcus.

I am rapidly reaching the point of urging my publishers to place a definite control on the destination of paper which we aid in generating and if such a control is placed, it is only human nature for you gentlemen to believe that this paper will go to the mills which at the present time are wholeheartedly co-operating with the Chicago newspapers and the Chicago office of the waste paper consuming mills.

This is the first installment of abridgments of papers presented at the annual meeting of **The American Pulp and Paper Mill Superintendents Association,** held in Chicago, May 24-26, 1944. More of these abridgments will appear in succeeding issues.

The Committee for Economic Development

ELMER T. STEVENS
Trustee of the Committee for Economic Development
President of Chas. A. Stevens & Co.

Before I became associated with the Committee for Economic Development, there was one thing about it which bothered me greatly; and that was its name. I found that rather baffling and could not get it to mean much. It seemed to me that a much better name could have been chosen, but now I feel that the choice of this type of name was well considered. The builders of the organization had strong, positive objectives; but, at the same time, there were somethings which they wanted not to do, a listing of a few of which will explain the advantage of the name.

In the first place, they wanted not to build a permanent organization but one which is to fade out of the pitcure as soon as it may.

Secondly, in many cases where there are adequate organizations already functioning, the Committee prefers to stay in the background and to work through those organizations.

Thirdly, while the organization is concerned with the stimulation of postwar planning, it is not in itself one of these postwar planning committees.

In the fourth place, it is pledged to abstain from all lobbying.

For the purpose of this discussion, we will consider the name entirely unimportant and will refer to the organization merely as C.E.D.

Having heard the foregoing negative points, you are probably wondering just what C.E.D. is:

C.E.D. is an independent, voluntary organization of business men.

It is formed solely to help American business bring about high levels of peacetime employment and production after the War.

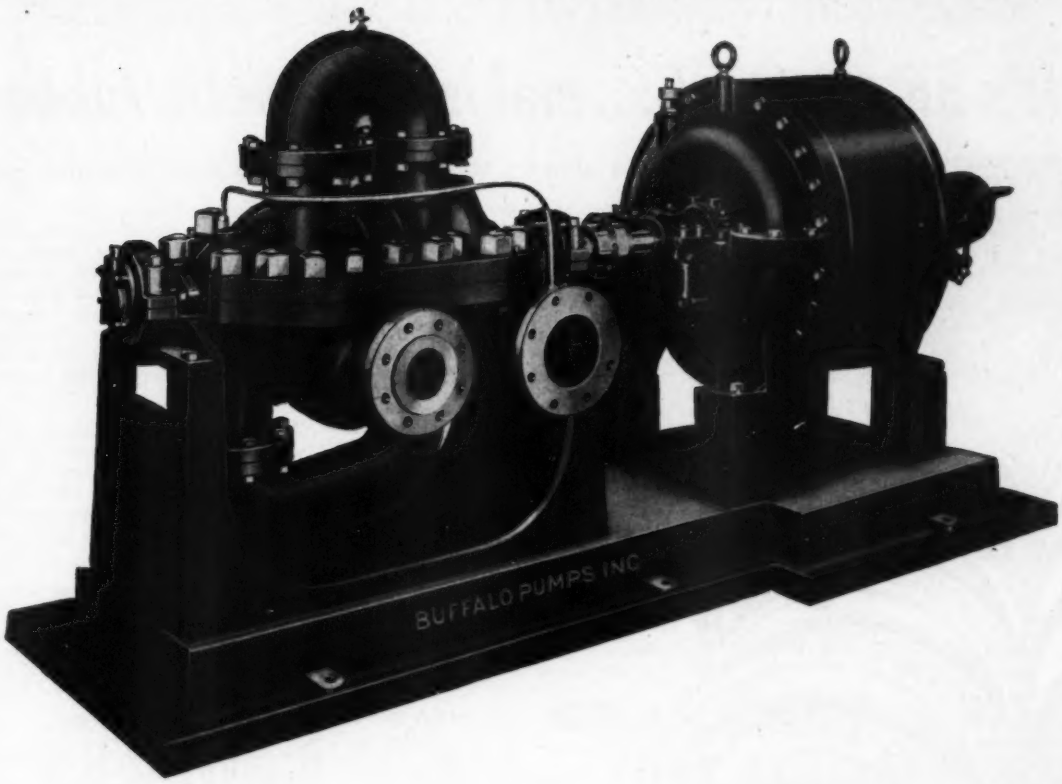
Although it receives valuable co-operation from numerous government departments, it has no connection with any of them and is completely independent. And here are some more negatives. It is nonprofit, nonpolitical, nonpartisan, nongovernmental. It is not a trade association and is not a pressure group.

It was formed because government and business leaders agreed that America's postwar reconversion problems were so urgent and no present business organization was equipped to do justice to them.

The men steering the activities of C.E.D. are divided into four main groups:

First, there is a Board of Trustees . . . 25 in number . . . which meets four times a year and the membership of which is selected from the standpoint of regional leadership. There are three other Committees.

One group consists of the Regional Chairmen of the Field Development Di-



Now, it CANNOT be told!

We can't say what we'd like to in this advertisement. We can't tell you where our pumps are going—or what they're doing. We can't even quote the service reports which praise their performance.

We can only say that we are still building pumps that really PERFORM on tough jobs—that we're building more in a month than we formerly built in a year—and that we will be better able to serve you than ever in the past.

Buffalo Pumps are not low-priced but they are worth the extra that fine quality always costs.

BUFFALO PUMPS, INC.

213 Mortimer St. Buffalo, N. Y.

Canada Pumps, Ltd., Kitchener, Ont.

"Buffalo"

Centrifugal PUMPS

HOW AMERICAN INDUSTRY PRODUCES MORE, FASTER, BETTER—WITH BOWSER EXACT LIQUID CONTROL

It's an exact job...making synthetic rubber

FOR TODAY'S WAR CARS AND TOMORROW'S PLEASURE CARS

Making synthetic rubber is a precision operation. The relative quantities of various liquid ingredients is a prime factor. And with mass production of synthetic, precision-handling of liquids becomes a mass operation, too.

It's significant that National Synthetic Rubber Corporation, of Louisville, as well as all other producers of synthetic, chose batteries of Bowser Meters for this difficult work. Only Bowser Meters, which automatically shut off at a predetermined point and print a record of the delivery, are used for the measuring of the actual liquid ingredients.

This 100 per cent selection of Bowser was guided by past performance in similar work and by records for accuracy and dependability that Bowser Meters have established in hundreds of industries over the years.

Meters are only one phase of Bowser Exact Liquid Control.

In the Paper Industry, for example, Bowser Lubrication Systems for dryers, calender stacks, Jordans, hydrafiners and turbines have been the almost universal choice for many years. Virtually all pulp and paper mills in the United States and Canada, as well as many in Europe, are Bowser-equipped.

Besides the continuous circulating and filtering systems, the paper industry also widely uses many smaller Bowser units, such as force feed lubricators, oil filters for steam engines, flow indicating devices, etc.

A major reason for Bowser's dominance is that Bowser installations are engineered to meet the exact requirements of the mill. BOWSER, INC., Fort Wayne 5, Ind.

BUY WAR BONDS

Not only has Bowser's war production earned the Army-Navy E...Bowser equipment has helped earn it for scores of other companies.

BOWSER ESTABLISHED 1885

The Name That Means Exact Control of Liquids

vision. The Field Development Division, under the leadership of Mr. Marion B. Folsom, Treasurer of the Eastman Kodak Company, has divided the United States into twelve regions corresponding generally with the Federal Reserve areas and has appointed an outstanding business leader in each area as Regional Chairman. These regional chairmen in turn have appointed state, district and community chairmen within their own areas. These regional chairmen meet with the Board of Trustees in their trustees meetings. The Regional Chairman for this area here is Ralph Budd, president of the Burlington Railroad.

Another group is the Research Division. This is composed of men representing a wide range of business who have retained a full-time staff of economists. Ralph E. Flanders, president of the Jones and Lamson Machine Company of Springfield, Vermont, is the chairman of this Division; and Theodore O. Yutems, Professor of Economics of the University of Chicago . . . on leave . . . is the research director. The Research Division is assisted by a Research Advisory Board made up of outstanding economists headed by Dr. Summer H. Slichter of Harvard.

The fourth group is the Finance Committee under the chairmanship of Carle C. Conway, president and chairman of the Continental Can Company, and co-chairman Sidney J. Weinberg, partner of Goldman, Sachs and Company. The activity of this Committee is obvious. C.E.D. might have been financed by the Government, but the founding group felt that it would be best to have it entirely independent.

Of these four groups, nothing further need be said of the Trustees or the Finance Committee. The interesting part of the undertaking lies in the other two groups . . . the Field Development Division and the Research Division. These two groups are actively engaged in stimulating postwar planning . . . note that word "stimulating" . . . to the end that we may have the highest possible level of employment and production in the peacetime after the war.

Perhaps I should pause here to say that these men who have built and are guiding C.E.D. are terribly cognizant of the fact that we are at war, that the war has not been won, and that nothing must be done in postwar planning which will interfere with the winning of the War.

We must be sure *now* to take steps to prevent either mass unemployment or mass government employment in the postwar period. Either would put our freedoms in jeopardy. his is the concern of C.E.D. . . . for the postwar period . . . employment and, more than that, *productive* employment.

There is general agreement among responsible statisticians that from fifty-five to fifty-eight million jobs will be needed in the postwar period if a satisfactory situation is to prevail. In this total area, from two to two and one-half million men and women who will be employed in our Army and Navy establishments which, it is believed, will be notably larger than before the War. The figure on which to focus is that of seven to ten million additional civilian jobs which we shall need beyond those available in 1940.

Most of the seven to ten million new civilian jobs must be found in the field of private endeavor. Pay careful heed to that phrase "private endeavor." I did not say "manufacturing." Manufacturing in normal peace time accounts for only 23 per cent of total employment. Actually, there may be a contraction in manufacturing employment after the war, but there is great opportunity for expansion in employment in trades and in construction in the postwar period.

I should like to stress the fact that these jobs must be found in the field of private endeavor because too many people, both in business and in government, are under the impression that if private productive jobs are not available, the slack can be taken up through an expanded public works program. Good information indicates that, if a green light were given to all public works projects now blueprinted or in the process of being blueprinted, jobs might be available within a year after peace for some three million individuals. That is only one million more than were employed on W.P.A. or P.W.A. in 1940.

Because so much has been said about full employment and so little about full production, fallacies are creeping into our thinking. First, the spread-the-work idea is being exploited energetically. A bill has been introduced in Congress calling for the gradual reduction of the work week to 30 hours, and from various other per-

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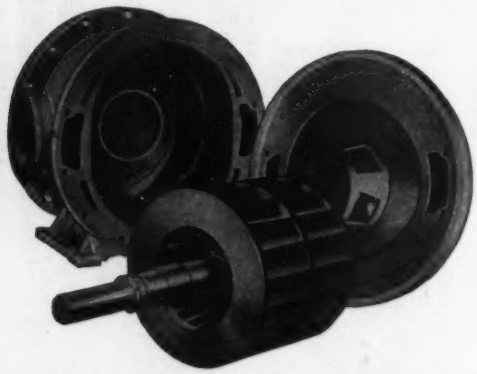

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sons has come the suggestion of a 30 hour week with 40 hours' pay immediately at the close of the War.

None of the proponents of the 30 hour week contend that 40 hours of work per week is excessive. Their aim is to provide more jobs by spreading the work. They forget that only by producing more can we have more to divide. They don't realize that they are preaching a gospel of despair and launching a downward spiral attack on our standard of living.

A second fallacy which is a direct result of thinking solely of jobs in terms of numbers is a reappearance of that old bugaboo technological unemployment. We are being told that technological advancements accumulating during this war period should be introduced in our postwar economy with great caution. It is the fear of some of those in C.E.D. who have studied the matter that, on the contrary, it is going to take too long to secure the advantages of the new materials, the new manufacturing processes, and the new inventions which have been spawned by our tremendous war effort. Only by speeding up the application of these advances can we bring into full play that requisite for expanding markets . . . better, fresher merchandise at prices that mean better values.

Assuming, if I may, that we are in agreement on the importance of concentrating on attaining quickly in the postwar period a vast increase in our peace time output of goods and services, it seems to those of us in C.E.D. that two conclusions are inescapable if we are to preserve a free economy:

1. Individual enterprises, large and small, must start *now* to plan their own postwar products and postwar markets;

2. The economic "climate" in the postwar period must be favorable to the expansion of enterprise. Not only those policies adopted as war measures but all policies of government, business, and labor that stifle initiative and interfere with expanding production and employment must be changed.

Now to return to the two major divisions of C.E.D. which carry out its activities . . . the Field Development Division and the Research Division.

The Field Development Division has two functions: (1) To gather from all possible sources helpful information on postwar planning and (2) to disseminate that information to as high a percentage of America's employers as possible.

Much information of value to all business men already has been accumulated. More is being gathered. Experts in manufacturing, marketing, sales, finance, and management engineering have pooled their knowledge and are making it available to all business men.

Then comes the responsibility for the dissemination of this information to as high a percentage of America's two million employers as possible. To accomplish this goal, as was stated earlier, the country has been broken down into regions generally identical with the Federal Reserve Districts . . . the regions divided into districts . . . and the districts into communities. Nearly two thousand community chairmen are in action, and working with them are some forty thousand of America's topflight business leaders . . . in touch with industrial firms representing more than two-thirds of the Nation's peacetime production. And the organization is expanding at an accelerating rate.

But, even if we assume that the Field Development Division is entirely successful in its efforts, that, of itself, does not give assurance of success. All policies of government, business, labor, and agriculture must be examined from the point of view not of an economy of scarcity but of an economy of plenty. In other words, if we are to have the wanted high level of production and employment, we must have the proper conditions under which business can grow the right "climate." This brings us to the Research Division which is charged with the responsibility of studying out what is the right kind of "climate" and of making its studies public property.

The Research Committee is a committee of business men drawn from a wide range of experience and viewpoint and selected to give a variety of views rather than a particular point of view. It functions in two ways. First, by the preparation and publication of reports on approved projects and, secondly, by the preparation and publication of statements of policy.

Of paramount importance is the necessity that government, business, labor, and agriculture must subordinate any group

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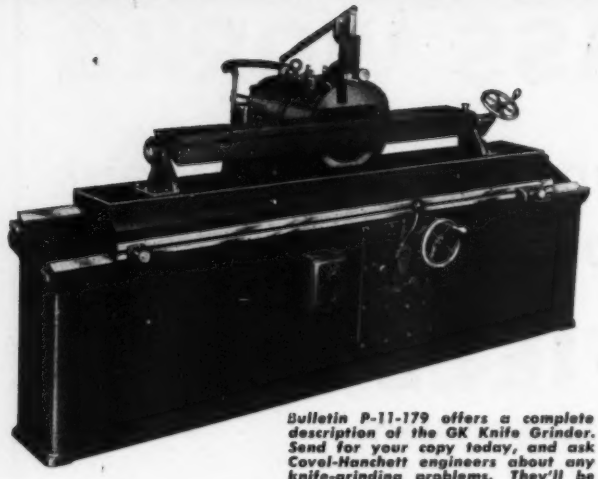

Bulletin P-11-179 offers a complete description of the GK Knife Grinder. Send for your copy today, and ask Covel-Hanchett engineers about any knife-grinding problems. They'll be glad to help.

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interests and work together for the common good. If government hampers business unnecessarily, if business for selfish objectives fails to give markets the stimulus of better values, if labor continues unwarranted restrictions on output, if we as a people show timidity or accept defeatism, we can lose.

When 194x comes, the savings of the nation will be at record-breaking heights. Our supply of raw materials will be ample. Our plant facilities will be greater than ever before. We shall have a peak supply of skilled production and management workers. And we shall have a pent-up demand for goods that is tremendous. C.E.D. has confidence that with these assets American imponderables of courage, wisdom, tolerance and industry will win the peace.

Suggestion Systems

F. A. DENZ*

We have heard a great deal about employee suggestion systems since Pearl Harbor. Through the fine work of War Production Drive Headquarters at Washington, many thousands of such systems have been inaugurated in industry. The movement has gained such momentum that many industries which at the moment do not already have such a system in effect, are now considering the installation of such a plan.

Among the outstanding contributions of the employee suggestion system has been the conservation of valuable man hours and critical materials during one of the most trying hours this Nation has faced. Aside from these practical results, the more harmonious relations between labor and management growing out of this man to man association has been of unquestionable value.

The Man of Galilee a long time ago taught us to do unto others as we would that others do unto us. Great volumes have been written on labor relations, or industrial relations, if you prefer, but I think that nowhere will we find a clearer cut definition of human relations than in these words of the Master.

Even centuries before the Master uttered His clear-cut definition of human relations, Solomon in the Book of Proverbs urged man to get wisdom, but with all his getting, to attain understanding. In the national war drive, both labor and management have found mutual understanding. They have learned to work together in common interest as never before.

As a result of a proposal advanced to industry by United Air Lines, there was formed in July of 1942 an association for suggestion system administrators known as the National Association of Suggestion Systems. The association holds two conferences per year. Since its organization, the association's conferences have been held at Chicago, New York, Cleveland and on May 3 and 4 of this year at Pittsburgh. The Pittsburgh meeting was attended by over 300 delegates representing some 175 Companies and Governmental Agencies from coast to coast. Out of these conferences come new ideas and simplifications toward improving the suggestion system which the delegates carry back to their respective plans.

To those of you contemplating the installation of a suggestion plan, let me urge you to give careful consideration to proper planning and to the designing of your system even before the suggestion plan is formally announced to your organization. In other words, get the necessary machinery set so that when your volume of suggestions begins to increase, you will have adequate facilities for prompt handling. You need not worry about lack of suggestion volume because as soon as your employees sense a sincere motive behind the plan, you can be sure of their wholehearted co-operation and support. Among these planning considerations might be listed:

1—Paper work and records such as the suggestion blank, investigation forms and records.

2—Provision of suitable suggestion boxes

3—A suggestion index record to provide a ready cross reference for the suggestion office.

4—Publicity for award winners

5—Committee activity

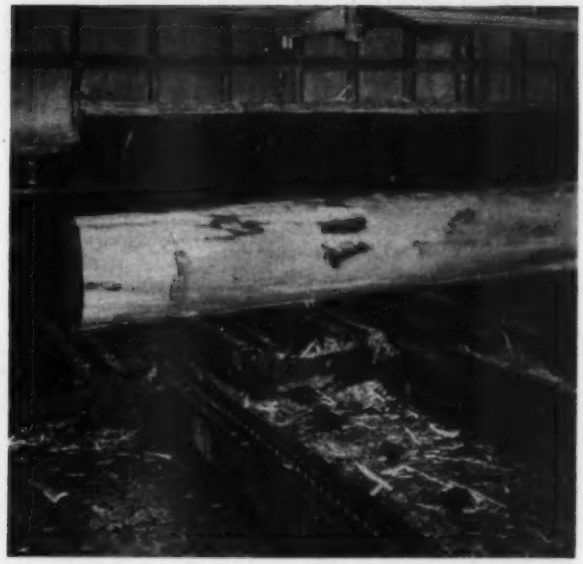
6—Suggestion Board policy, such as award payments, eligibility and other procedures.

7—Complete co-operation of top management.

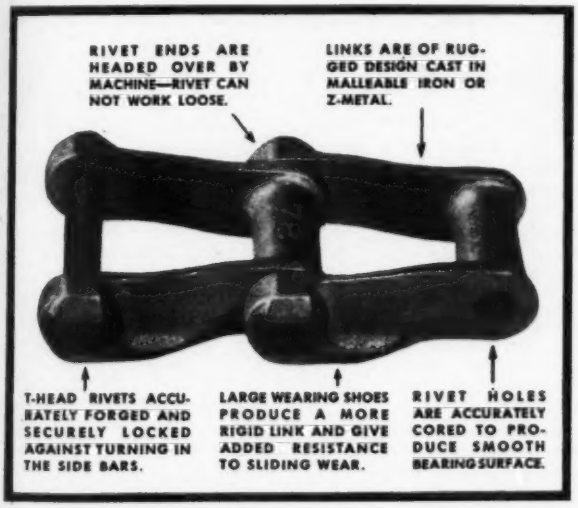
8—Competent full time personnel vested

(*) General Chairman, UAL Employees Suggestion Conference, United Air Lines, Inc., Chicago, and, Executive Secretary, National Association of Suggestion Systems, Chicago.

1 IT'S QUITE A WRESTLER, this sturdy Rex Riveted Mill chain belt, and it surely knows how to grapple with logs—how to throw high cost to the mat—and keep it there! In mill after mill, it's established records for low cost, efficient operation that will stand for some time to come.



2 TOUGH SERVICE, such as that on this debarking conveyor, really tests the mettle of a conveyor chain. And Rex Riveted Mill comes through with flying colors. Its wide bearing shoes are made-to-order for sliding on floors and runways, and its rugged design helps it withstand heavy shock loads.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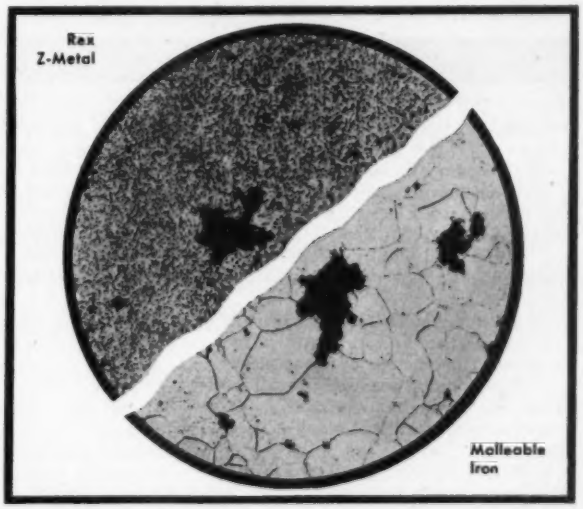
RIVET HOLES ARE ACCURATELY CORED TO PRODUCE SMOOTH BEARING SURFACE.

3 GETTING BACK TO THAT HEADLOCK, notice the way the pin is locked into the side bar. A headlock cast on the link prevents the pin from turning and confines wear to the wide bearing surface inside the barrel. . . . promotes maximum life. And note the other quality Rex features.



4 FOR EXTRA LIFE, combine tough Riveted Mill chain with the strength of Rex Z-Metal. This photomicrograph (200 times magnification) shows the uniformity of Z-Metal's grain structure—in comparison to high quality malleable iron—a uniformity that imparts the greater strength, hardness and *corrosion resistance* to Z-Metal chain belts.

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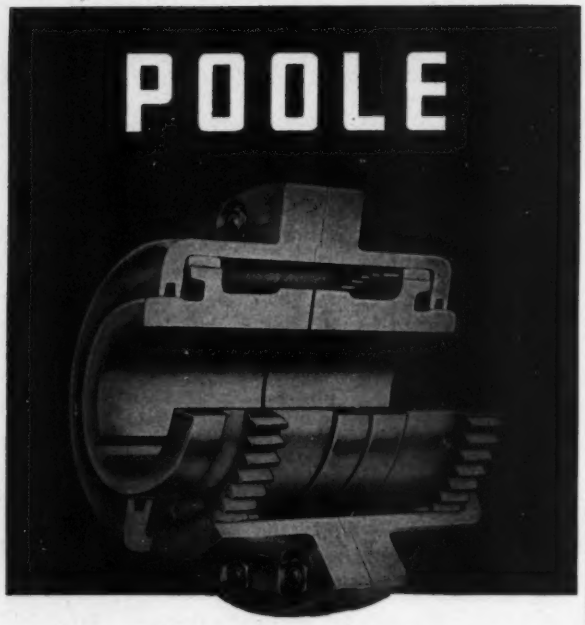

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with necessary authority to administer the plan.

Once the plan is in motion, and has been properly announced to the entire organization, here are a few items that bear careful and constant consideration:

1—Fairness and generosity in the issuance of suggestion awards and granting recognition where due.

2—A steady publicity program within your organization to keep award winners constantly before the eyes of management.

3—Provision for employee participation in suggestion committee meetings.

4—Promptness in the handling of suggestions.

5—Publicizing of plant problems as thought stimulators for suggestions.

6—Providing suggesters with explanations as to the reasons for rejections through either personal contact or by written notice.

While it is fully recognized that each suggestion plan must be patterned to fit the individual situation, and that there is more than one way to conduct a successful program, I would like to present to you an outline of the operation of United's Employees Suggestion Conference. Our plan at present is averaging approximately 650 suggestions per month from our 7,500 employees. Of this volume, approximately 20% are adopted with award payments in U. S. War Savings Bonds and Stamps.

All suggestions, regardless of point of origin (and we have 52 operating points coast to coast) are sent via Company Pouch to our main suggestion office at Chicago where they are time stamped, properly recorded in our index record and then assigned to a suggestion investigator. If the employee has signed the suggestion, he receives a written acknowledgment and is kept posted by special letter from time to time as to the progress of the investigation until the file is closed by the committee, after which he receives a detailed explanation of the reasons for rejection or acceptance of his idea.

As soon as the investigation has been completed, all suggestions are then routed through an "Employees Committee." Each month, we select a station from among our 52 operating points and appoint one or more employees in non-supervisory capacity from each department to serve on the Employees Committee. In this way, all departments are represented. The meetings last two days. It is the responsibility of this committee to monitor all suggestion files and to act on them as follows:

1—If the idea has been adopted in the course of investigation, this committee makes the award recommendation.

2—If the idea has been rejected during investigation, and the committee agrees, this agreement constitutes a rejection and the file receives no further attention.

3—If the Employees Committee does not agree with the findings of the investigation, it is invited to make a recommendation to management as to further necessary considerations.

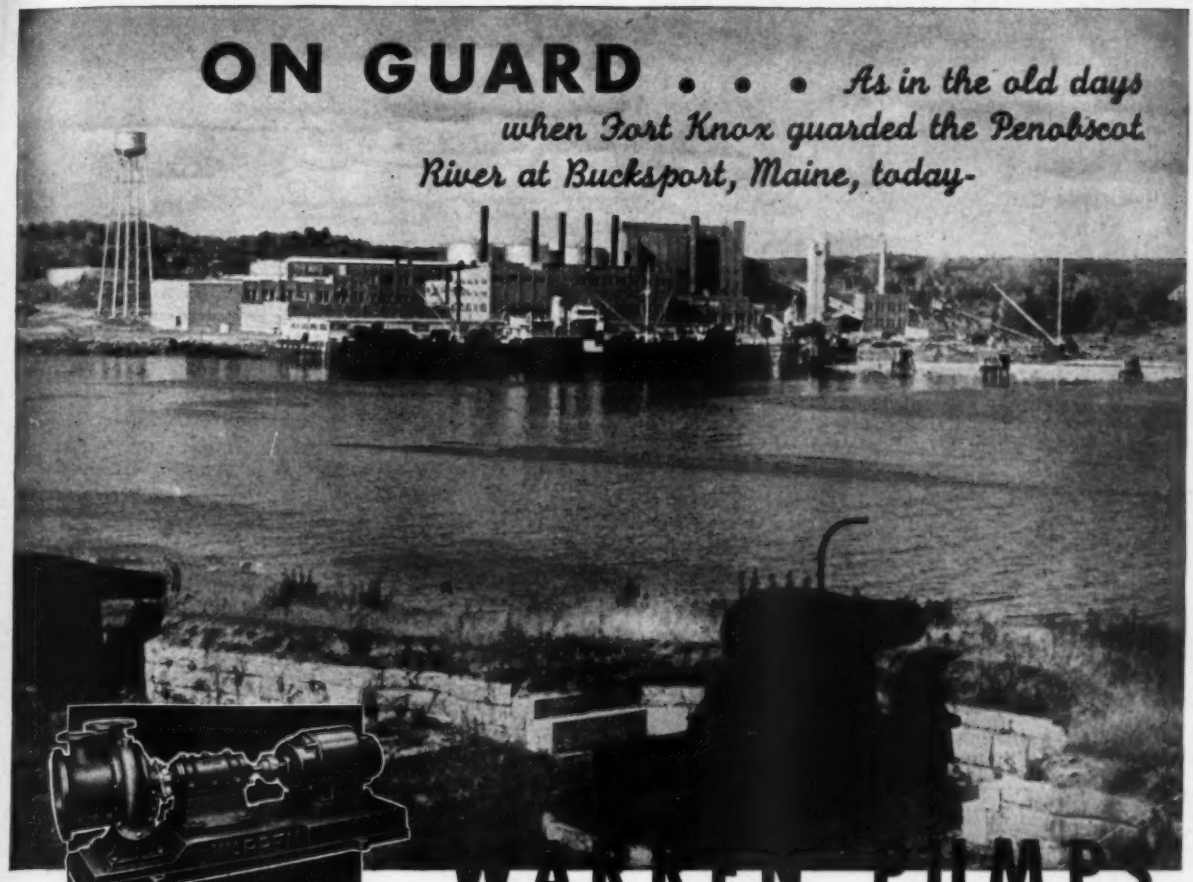
This two day employee meeting, in effect, serves as an educational program for employees throughout our system in order to convey the purpose of the program. It also provides employees with a definite voice in the suggestion activity which is, in fact, their own program.

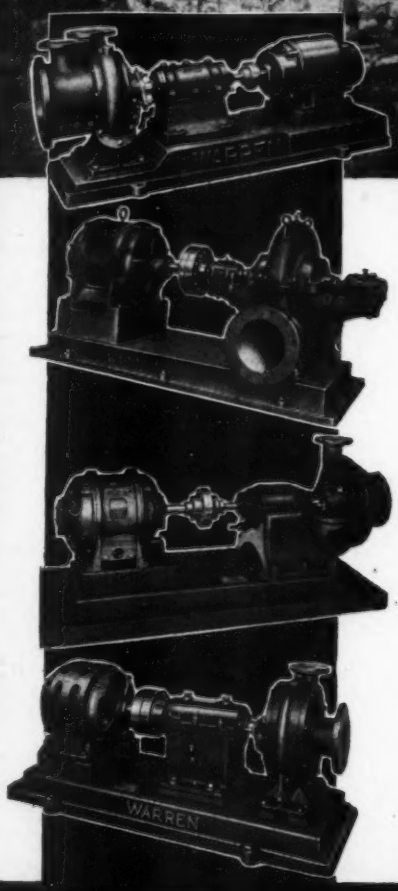
The recommendations from the Employees Committee are then brought back to Chicago where they are listed in docket form. Each suggestion and the findings of the investigators are summarized and the recommendations of the Employees Committee are shown. This docket is made available to our main conference consisting of twelve executives one week in advance of the meeting so that they may have the opportunity to familiarize themselves with the suggestions and make such further investigation as they desire in order that they may judiciously discuss the suggestions at the meeting. The main board meeting procedure is, as a result, a simple task because those attending are well-informed and come to the meeting prepared to render final action.

Following the meeting of our main board, we issue a 60-page bulletin to each of our 7,500 employees, showing the disposition of their suggestions and listing detailed explanations as to board action on all award suggestions and those rejected suggestions where the board comment may be of general interest.

As an instance of the benefits derived by United Air Lines from this program, one of our inspectors at our central maintenance base at Cheyenne, Wyoming, received an award of $1,200 for his suggestion of a simplified passenger seat reclining mechanism used on our *Mainliners*. A clerk in our accounting office received an award of $300 for an idea which eliminates the writing of some 400 individual letters per month. A $75 award went to one of our mechanics at

ON GUARD . . . *As in the old days when Fort Knox guarded the Penobscot River at Bucksport, Maine, today-*





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Denver for the development of a battery connector which eliminates the possibility of shorting batteries in handling while on charge. More recently, one of our Cheyenne mechanics received a $1,300 award and several others received $500 awards for labor saving suggestions.

This is but one way of many in which you might conduct your suggestion program and it is presented for your information with the hope that some of this data might be of interest and assistance.

Aside from these material benefits, the suggestion system can serve as a valuable aid in improving personnel relations. One of its most important functions is to imbue the minds of employees with the fact that this is "their" Company and that through the suggestion plan they have an opportunity to participate in the management of their Company. That, as I see it, is the substance of the plan and that means improvement of management-labor relations.

A system that has contributed so largely to the success of the Nation's War Drive can continue to contribute to success when the Nation is once again back on a peacetime basis in the development of new products and new sources of business. The suggestion system has proven itself and it is worthy of our best efforts to support it and sustain it. It is worthy of your most serious consideration.

This is the fourth installment of abridgments of papers presented at the annual meeting of the **Technical Association of the Pulp and Paper Industry,** held in New York City, February 14-17, 1944. Monthly installments of these abridgments will appear in succeeding issues.

Fundamental Research on Tall Oil and Sulphate Turpentine and Commercial Exploitation of Results

TORSTEN HASSELSTROM
Director of Research
G. & A. Laboratories, Inc.

During the present emergency, tall oil and sulphate turpentine enjoy a demand in excess of normal times. The government encourages kraft mills to recover these products which had previously gone to waste or been used as fuel. Crude sulphate turpentine is refined and used to extend the present dwindling stores of gum spirits and steam distilled turpentine. Tall oil is, in addition to old uses, now chiefly employed as a substitute for the more expensive fatty acids in soap manufacture and as a drying oil for cheap paints.

It is of interest to note that this development closely follows a similar pattern as to the demand of tall oil in the Scandinavian countries during the last war when scarcity of fats and paint thinners were prevalent. Immediately after that war when vegetable oils and rosin again were available, only those kraft mills were able to sustain production of tall oil which did not sell crude tall oil on the open market but used it as a raw material to manufacture other products. The Scandinavian countries in the early twenties established sufficiently high tariffs on vegetable oils of which they are large importers to encourage production and home consumption of tall oil. During the years of peace following, it served as a substitute for fatty acids in a variety of industries, mainly for soap stock and drying oils. The great expansion of the kraft paper industry in these countries, however, caused a constant surplus of tall oil which they dumped at low prices on the foreign markets. This procedure discouraged the recovery of kraft by-products in various countries including the United States. Accordingly, there were not sufficient pertinent reasons to spend money and effort for the development of by-products which were obtained in comparatively small quantities; about 1 to 2% of the total value of marketable output produced and which would serve only as substitutes.

On first sight, crude sulphate, turpentine, and tall oil are in and by themselves not attractive products, even in a chemical sense. American tall oil contains a somewhat larger amount of resin acids than the Scandinavian product; it being approximately 50 to 55% of resin acids, 30 to 45% of fatty acids and about 8 to 10% of unsaponifiables. The value of the crude tall oil soap for the sulphate pulp mills is represented by its fuel value and its content of sodium salts which are reused in the pulping process. It is understood that when wood, rich in resins is employed for the manufacture of kraft pulp, the surplus crude tall oil soap is definitely undesirable because it causes excess foaming in the evaporators. Therefore, in the not too distant past, some mills were compelled to discard some of it as waste material of no value whatsoever, to secure normal processing conditions for their soda recovery.

The resin acids originate from the heartwood; the fatty acids and the main part of the unsaponifiables from the sapwood of the pine tree. The resin acids of tall oil are a mixture of Steele's abietic acid and probably a small quantity of d-pimaric acid though not yet identified. Hence, the resin acids of tall oil differ from the resin acids of ordinary pine tree rosin, in which the abietic acid part is a mixture of primary abietic acids in various stages of transformation together with 15 to 30% of d-pimaric acid.

Steele's abietic acid of all the known resin acids, is the most unstable to atmospheric oxidation. This explains the technically inferior quality of the resin acids of tall oil in comparison with ordinary gum or wood rosin acids. The chemistry of the resin acids of tall oil has only recently been made understandable to the organic chemist. The complicated nature of this chemistry has up to the present time greatly retarded the full utilization of this material as well as of ordinary pine tree rosin.

The tall oil fatty acids are a mixture of unsaturated fatty acids similar to those commonly encountered in vegetable matters, viz; linoic acid, oleic acid, linolenic acid, ricinolenic acid, together with small amounts of high molecular fatty acids. Scandinavian tall oil contains palmetic acid which, however, is partly a secondary product because of the action of the alkaline cooking liquor on the oleic acid originally present in sapwood.

The unsaponifiables of tall oil contain abundant quantities of sterols of which 22-dihydrostigmasterol is one of the primary constituents together with lignoceryl alcohol and other high molecular hydroxy compounds which apparently comprise the oil soluble vitamins of the pine tree.

Crude sulphate turpentine because of its mercaptan content, cannot be used to replace gum spirits or steam distilled turpentine as paint thinner, in shoe polish, etc., without refining. Crude or refined tall oil because of its highly unsaturated fatty and resin acid content is not suitable for the complete replacement of tallow, vegetable oils, or rosin in laundry soaps, nor for use alone as a drying oil, although it may be used as an extender but only in such amounts as may not cause serious deterioration in the final products.

The technical processes for refining of sulphate pulp by-products here and abroad have almost exclusively comprised methods of distillation and in simple methods to improve the odor and color of turpentine and to raise the fatty acid content of tall oil.

When freed from water, American crude tall oil rapidly forms a semi-solid mass on standing. This procedure may be accelerated by stirring and cooling to below room temperature. The solids and liquids may be separated by filtration, whereby a considerable part of resin acids originally contained in the crude is collected in form of a press cake. (Hasselstrom, U. S. Patent No. 1,986,816.) Recent tests by manufacturers have shown that this method of separation is economically sound. The liquid part is dark in color and contains about 35 to 45% of resin acids, and constitutes a refined tall oil which may be used as a flotation reagent (Ibid, U. S. Patent No. 1,986,816), (Ibid, Hasselstrom, U. S. Patent No. 1,986,817). Such refined tall oil may also be subjected to additional refining by means of distillation in vacuum, in which case larger yields of distilled refined tall oil are obtained than when ordinary crude is subjected to distillation without previous filtration.

The solid press cake contains Steele's abietic acid, in addition to small amounts of saturated fatty acids and some ligneous matter (Hasselstrom and Bogart, *Journal Am. Chem. Soc.*, 57,2120, 1935). On crystallization, the abietic acid can easily be obtained in high purity and in high yields (Hasselstrom, U. S. Patent No. 2,190,660). It is of significance that the tall oil resin acids in crude or refined form, are not only more uniform in composition than the resin acids of gum and wood resin, but

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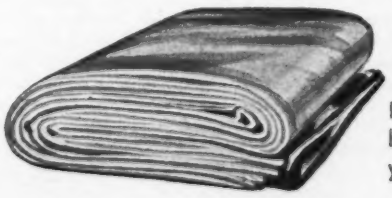

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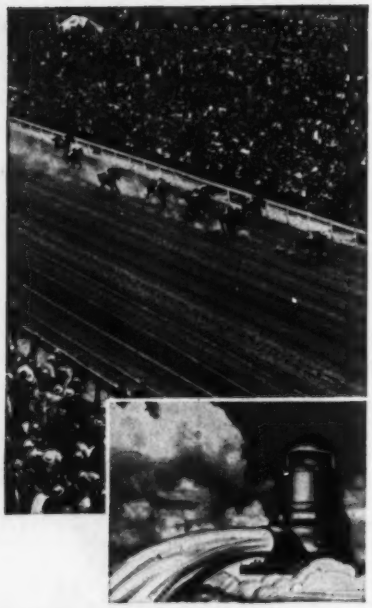

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are apparently devoid of d-pimaric acid.

The fatty acids of the press cake contain saturated acids of higher molecular weight than stearic acid of which a new one has been isolated from the mother liquors obtained in the crystallization process of abietic acid of the press cake (Hasselstrom and Bogart, *Journal Am. Chem. Soc.*, 57,-2120, 1935), (Hasselstrom and Lewis, Unpublished results). Even this fact is of technical interest since such higher saturated fatty acids belong to a group of acids which commonly occur in natural waxes.

Crude sulphate pulp or liquid refined tall oil is easily selectively esterified with aliphatic primary alcohols. The reaction proceeds very smoothly, for instance in the presence of methanol when no more than about 10% is needed to obtain complete esterification of the fatty acids (Hasselstrom, *Paper Trade J.*, July 8, 60, 1926). From such partly esterified tall oil the resin acids are conveniently removed in batch or continuous operation by extraction with dilute sodium hydroxide solution in the presence or absence of a water immiscible solvent (Hasselstrom, Application on file with the U. S. Patent Office). The resin acids are removed in the aqueous layer as water soluble sodium salts. Such a resinate solution may be used as an emulsifier in soaps, size, etc., or with the resin acids may be regenerated by treating the resinate solution with a mineral acid.

The crude methylester fraction of crude tall oil is reddish brown in color and contains appreciable amounts, 5 to 15%, of unsaponifiables. This product may be subjected to catalytic hydrogenation at moderate pressure after pretreatment with active reagents to remove sulphur, to yield the methyl ester of stearic acid of high purity (Hasselstrom, Application on file with the U. S. Patent Office). In order to remove the bulk of unsaponifiables, the crude tall oil esters may be distilled in vacuum, whereby fatty acid esters of very high purity are obtained in the distillate, unsaponifiables remaining in the residue. On hydrogenation, such distilled esters yield on hydrogenation without any pretreatment, almost theoretically pure stearic acid methyl ester (Hasselstrom, Application on file with the U. S. Patent Office). These results show that the fatty acids of tall oil are easily separated from resin acids and can be refined into high grade products, which could serve to compensate a considerable part of the demand for fatty acids, both in time of peace and in war. Considering the fact that the kraft pulp industry produces up to about 6,000,000 tons of pulp per year, this corresponds to approximately 210,000 tons of pure fatty acids which are easily converted into stearic acid and other derivatives.

The unsaponifiables of tall oil contain, except for still unexplored vitamins, sterols, and high aliphatic alcohols. In the sterols fraction of tall oil, 22-dihydrostigmasterol has been isolated (Sandquist and Gorton, *Ber deutsch Chem. Ges.* 63, 1935, 1930), (Bengstsson, *Z. Physical Chem.*, 237, 46, 1935), (Hasselstrom and Hampton, *Journal Am. Chem. Soc.*, 63, 111, 1941) in amounts of about 3 to 8% and has, like the other sterols, been subjected to comprehensive fundamental chemical investigations during the last fifteen years. One of the most interesting results of these studies is the use of the tall oil sterol as starting material to make the male sex hormone, androsterone synthetically. Another important feature is that this sterol on irradiation is converted into an antirachitic vitamin, however, of much less potency than ergosterol.

Of the higher aliphatic alcohols, lignocerylalcohol has been isolated in Scandinavian tall oil, but not yet described as present in American tall oil.

It should be emphasized that the resin acids of tall oil are different from those of gum and wood rosin. The abietic acid of tall oil is the most unstable of all known resin acids and, hence, is unsuitable to replace gum and wood rosin, particularly for uses where resistance to light and air is desirable. This property of Steele's abietic acid in tall oil causes discoloration when used in soaps, varnishes, etc. The instability is caused by the conjugated system of unsaturation in the molecule of abietic acid. Recently, it was discovered that abietic acid, through disproportionation of hydrogen, could be transformed into a stable product (Brennan, Cairncross, Hasselstrom and Hull, U. S. Patent No. 2,272,628; Hasselstrom, U. S. Patent No. 2,311,386). When the tall oil resin acids are subjected to heat treatment in the presence or absence of catalysts (Hasselstrom, U. S. Patent No. 2,311,386), the resultant product contains more dehydroabietic and dihydroabietic acid than gum or wood rosin treated in the same manner (Hasselstrom and Brennan, U. S. Patent No. 2,299,577; Hasselstrom, Applications on file with the U. S. Patent Office; Hasselstrom, Brennan and McPherson, *Journal Am. Chem. Soc.*, 60, 1267, 1938; Hasselstrom, McPherson and Hopkins, *Paper Trade J.*, Jan. 25, 1940). This finding is of considerable technical importance, since dehydroabietic acid has the benzenoid nucleus and hence, may be subjected to all reactions of the aromatic series of coal-tar, such as sulphonation, nitration, Friedel-Craft reactions, etc.

The tall oil resin acids yield about 70 to 80% dehydroabietic acid on such catalytic treatment, whereas the best results so far obtained by us on gum and wood rosin is about 38 to 50%.

Crude stabilized tall oil resin acids are easily refined to a product of water white color and of high melting point, and is an excellent raw material for making of esters, ester gums, and types of artificial resins, all of which differ from the corresponding compounds made from gum and wood rosin, inasmuch as they are of higher melting point and stable to the atmosphere.

On sulphonation, dehydroabietic acid yields the 6-sulphodehydroabietic acid (Hasselstrom and McPherson, *Journal Am. Chem. Soc.*, 60, 2340, 1938; Hasselstrom, Brennan and Hopkins, *ibid.*, 53, 1769, 1941), (Hasselstrom, U. S. Patent No. 2,121,132; U. S. Patent No. 2,121,033; U. S. Patent No. 2,121,616; U. S. Patent No. 2,230,035; U. S. Patent No. 2,225,245; U. S. Patent No. 2,288,804; U. S. Patent No. 2,288,805; U. S. Patent No. 2,223,-926). This is an interesting compound and shows promises as a pigment carrier

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for paints. Other practical applications, such as detergents, as intermediate in chemical industry, etc., have been explored superficially (Hasselstrom and Hopkins, *Journal Am. Chem. Soc.*, 63, 421, 1941).

The dehydroabietic acid is easily nitrated to form a dinitroabietic acid which recently has been found to be the 6, 8-derivative (Fieser and Campbell, *J. Am. Chem. Soc.*, 69, 159, 1938; Campbell and Morgans, *ibid.*, 63, 1838, 1941).

On acetylation, according to the Friedel-Craft reaction, the 6-acetyldehydroabietic acid is obtained. It has been converted into physiologically active compounds of the female sex hormone type (Fieser and Campbell, 61, 2528, 1939).

Similarly to gum and wood rosin, crude or refined tall oil resin acids are easily converted into hydrocarbons. The resultant product is a complicated mixture of hydrogenated phenanthrene homologs which show many interesting chemical properties. It was recently discovered by Vasilev (*Chemical Abstracts*, 37, 4913, 1943) and independently by the author (Hasselstrom and Aaron, Unpublished results), that when this hydrocarbon mixture is cracked in the presence of catalysts, the result is a mixture of aromatic hydrocarbons, commonly occurring in coal tar, together with valuable hydrogenated derivatives of same. The compounds identified in the cracked material include propylene, benzene, toluene, xylene, cumene, trimethylbenzenes, tetraline and methyltetraline, pentane and iso-pentane, isohexane, decaline, methyldecaline, menthanes, etc. The fact that the resin acids of tall oil may be converted into such variety of hydrocarbons offers the most alluring possibilities to the organic chemist for the production of valuable products, which heretofore have been derived from other sources. The constituents of tall oil may well in the future serve as a raw material for making of plastics, dyes, pharmaceuticals, Nylon types of artificial silk, alcohols, explosives, solvents, etc.

When the resin acids are subjected to decarboxylation and dehydrogenation in the presence of convenient catalysts, retene, methylisopropylphenanthrene is obtained and has been extensively investigated. It may show promise for uses as an initial material for dye stuffs (Hasselstrom and Bogart, *Journal Am. Chem. Soc.*, 57, 1579, 1935) and pharmaceuticals (Cassaday and Bogart, *ibid.*, 63, 703, 1941). Recently, this hydrocarbon has by means of a specific catalyst, been converted into propylene and methylphenanthrene which may be developed as an intermediate for pharmaceutical products, dyes, etc. (Hasselstrom, *ibid.*, 63, 1164, 1941; Hasselstrom, *ibid.*, 63, 2527, 1941; Hasselstrom, and Todd, *ibid.*, 62, 1225, 1942).

Crude sulphate turpentine is obtained in amount of about 2 to 3 gallons per ton of cellulose and is being at the present recovered by most kraft paper plants. It is purified by chemical means and fractional distillation to produce the refined sulphate turpentine of commerce. The refined sulphate turpentine is competitive to gum spirits and steam distilled turpentine, and hence, subjected to great market fluctuations, which during the last ten years have varied between 17 to about 75c per gallon.

Crude sulphate turpentine lends itself easily and with equal yields as gum spirits and steam distilled turpentine to processes for producing synthetic pine oil (Hasselstrom, U. S. Patent No. 2,330,579; (*Idem* Application now on file with the U. S. Patent Office). When crude sulphate turpentine is treated with dilute sulphuric acid in the presence of effective emulsifying catalysts, it yields about 70 to 75% terpenhydrate, which is easily converted into high grade terpeneol; the chief constituents of ordinary pine oil. During this treatment, the mercaptan odor disappears and the terpeneol obtained cannot be distinguished from corresponding material made from gum spirits or steam distilled turpentine, thus making sulphate turpentine an excellent material for producing this commodity. The residues obtained in this treatment are rich in monocyclic terpenes which make them a suitable raw material for making of cymene and its derivatives including menthol and carvomenthol; they may also be sulphonated to yield sulphonic acids which may find its way as cheap emulsifiers.

Crude sulphate turpentine may also be chlorinated to produce stable, solid perchloroterpenes and polychlorotoluenes to be employed as insecticides, etc. (Hasselstrom, Application now on file with the U. S. Patent Office).

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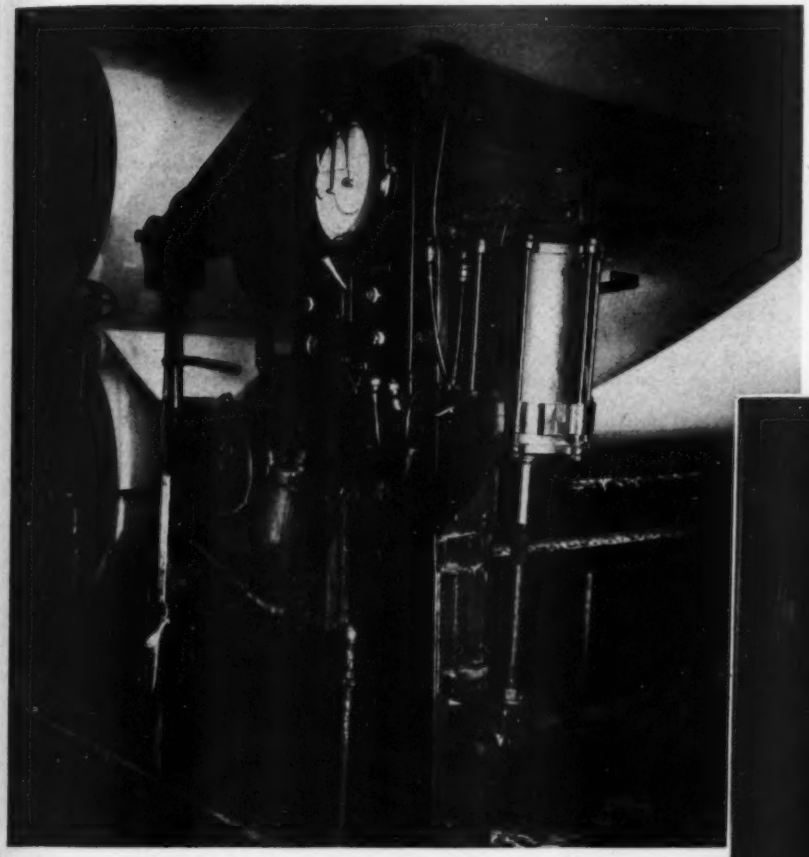

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pentine may be used as a raw material, is allo-ocimene and myrcene for which recently great interest has been shown as constituents of a novel type of synthetic rubber of different properties than those made from petroleum derivatives (Goldblatt and Palkin, *Journal Am. Chem. Soc.*, 63, 3517, 1941), (Palmer, *Ind. Eng. Chem.*, 34, 1029, 1942).

Other by-products of the sulphate mill, such as methanol, furane derivatives, etc., are not utilized, but could easily be recovered together with the crude sulphate turpentine.

The producers of fats and Naval stores are the natural competitors of tall oil and sulphate turpentine. It is believed, however, that gum and wood rosin pine tar as well as gum spirits, steam distilled, and d.d. turpentine, will always have their given place as important commodities. They have, except in exceptional cases, never been able to assume the position as true chemical raw materials, in the same sense as crude oil, coal tar, or cellulose; all of which is easily understood, considering that no true chemical industry can advantageously and without involving great economic risks be based on raw materials which have always shown such great price fluctuations as rosin and turpentine. Crude tall oil and crude sulphate turpentine should be able to satisfy this fundamental requirement, namely stability of cost of production.

Fats, vegetable oils, and Naval stores are far more expensive to produce than crude tall oil or crude sulphate turpentine. This still further emphasizes the favorable prospects for a more thorough utilization of sulphate pulp by-products. It would be logical to assume that should these by-products be employed for making of chemicals, they would not be in direct competition with the above mentioned industries, but would rather serve as a welcome supplement. Such a development is often experienced with the introduction of a new commodity. As for instance, rayon is not regarded as a substitute for silk, but has assumed a place in world commerce alongside with cotton, silk, and wool, and, in addition, has extended the employment of these types of textiles.

The average kraft pulp mill produces less than a carload of crude tall oil per day, and seldom more than 8,000 gallons of crude sulphate turpentine every 4 days. This small quantity cannot serve as an inducement for a mill to go in for any large comprehensive development of by-products. It is, therefore, hardly possible nor would it be economical for any one sulphate pulp plant alone to tackle the development of their by-products to utilize all the potentialities possible these products offer in the chemical sense.

Large chemical concerns may realize the potentialities of kraft mill by-products and become interested in the development of tall oil and sulphate turpentine as peace time propositions, since they would be able to rely on past experience in manufacturing and selling of chemicals, have a veteran staff of chemists and engineers and in addition will have possibly idle equipment. However, it is believed that such a trend would not greatly benefit the kraft pulp industry since then the industry would be compelled to continue to sell their by-products on a competitive market at low prices with no possibilities to capitalize on the ever expanding potentialities of their by-products.

It would be wise to assume that the kraft mills should find it to their advantage to develop their by-products along co-operative lines, which in this case, would mean the establishment of central plants. Such a central plant or plants organized as a separate industry could be capitalized by the different kraft mills themselves; their object would be the use of crude tall oil, crude sulphate turpentine, and possibly other sulphate mill by-products as raw materials for making less competitive high grade chemicals and the sale of the manufactured products.

Such central plants, owned by the kraft mills themselves, would enable the industry to enjoy full benefit of the possibilities offered by their by-products. Furthermore, an organization of this kind would be in the position to avoid more conveniently than any individual plant, the overproduction of these by-products when crude or refined tall oil and sulphate turpentine will, with the coming peace have to compete with those commodities they now strive to substitute or replace.

Limits of Effect of Acid Concentration-Digester Pressure Relation in Sulphite Pulping

W. F. HOLZER, Chief Research Chemist
Experimental Pulping Division
Central Technical Department
Crown-Zellerbach Corp.

It is probable that, with few exceptions, present digesters are limited to 100 pounds working pressure or less; and that on the outside an efficient acid plant with a pressure tower could maintain an acid of 7.5 to 8.0% total SO_2. Knowing these limits, a logical question is: Can an acid of 8.0% total SO_2 take full advantage of a digester pressure of 100 pounds, or vice versa?

To increase digester working pressure by a large amount, or to prepare an acid much stronger than 7.5% total SO_2 would require a rather extensive change in equipment. A second question arises: What benefits could be obtained by increasing working pressure a reasonable amount, and how strong an acid would then be used?

To obtain some information on these questions, series of cooks were made in two ranges, one at maximum digester pressures of 95 pounds with acid strengths in the range of 6.0 to 8.75% total SO_2 and the second at maximum pressures of 110 pounds with acid strengths in the range of 8.0 to 11.5% total SO_2. In all cases maximum temperature was constant at 135 C. and combined SO_2 was constant at 1.25%. The same temperature curve was used throughout, a uniform rise to maximum in 4.5 hours, and this maximum maintained for the balance of the cook. Pressure rose to maximum as temperature was being raised, and then was relieved

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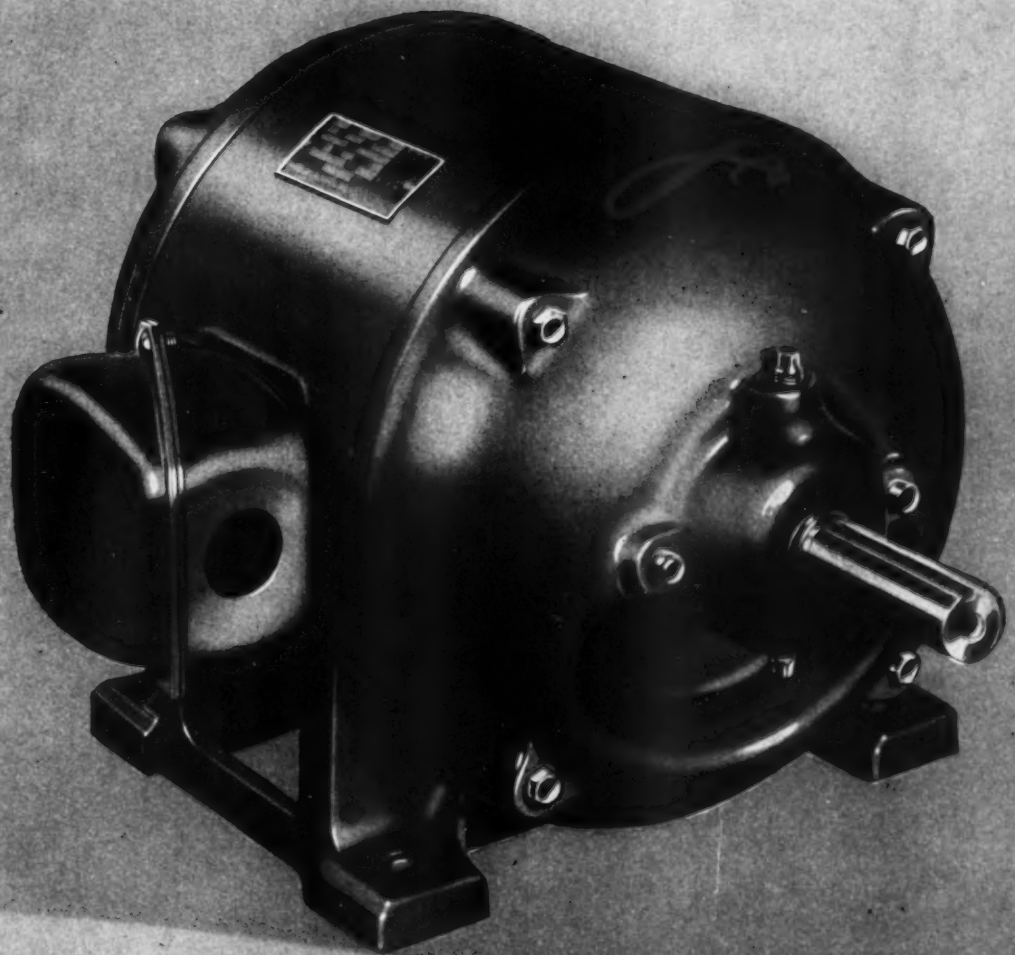

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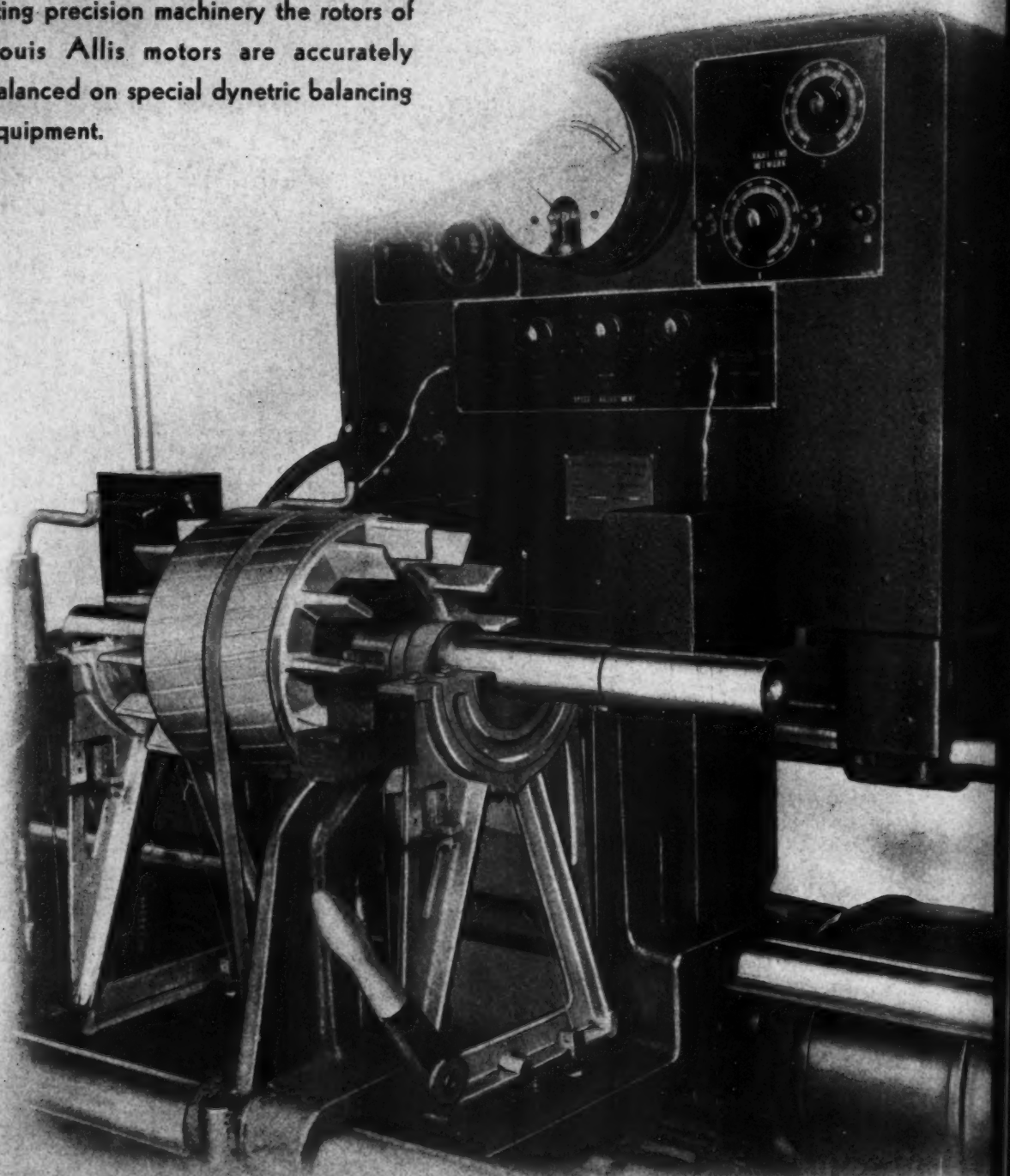

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until temperature reached maximum. There was then no further relief until the blow-down which started 1.25 hours before the end of the cook. Total time for all cooks at 95 pounds pressure was 8.5 hours, for all 110 pound cooks 7.75 hours.

All cooks were made in a stainless digester having a pulp capacity of 30 pounds, and cooked with an indirect heating, forced circulation system. Cooking conditions, that is temperature and maximum pressure, were controlled by instruments.

Sufficient commercial chips of Western hemlock were taken at one time for an entire series, and stored in closed containers. Acid was made up in a stainless steel accumulator using a commercial Jensen tower acid and relief from the previous cook. Strength was adjusted with liquid SO_2.

Tests on the cooking acid were made by the Palmrose method *(Paper Trade J.* 100, No. 3:38-9, Jan. 7, 1935). During the progress of the cook acid samples were removed through an efficient condenser, and tested by the Haug method *(Papir-J.* 22, No. 22;252-5, Dec. 15, 1934). Samples were taken when maximum temperature was reached and relief stopped, at the middle of the period of maximum temperature, at the start of the blow down, and just prior to the blow. In all 110 pound cooks an additional sample was taken when maximum pressure was reached and relief started.

Bleachability of pulps were determined by TAPPI Standard T 214 m-42, and are reported as per cent chlorine. Strength was developed in a Valley beater according to TAPPI Standard T 200-m-43, and handsheets were made and tested according to TAPPI Standard T 205 m-40.

Tests of acid strength during the progress of the 95 pound cooks are given in Table I-A. It might be expected that, when relief stopped due to attainment of maximum pressure, a constant acid concentration would be obtained for a given temperature and pressure regardless of initial concentration. This was not the case. Only 4.18% SO_2 remained of an acid starting with 6.06%; whereas 5.00 and 5.10% remained from the two stronger acids starting at 7.58 and 8.78% respectively. This seems best explained by the possibility that the smaller amount of relief available in the first case was not sufficient to sweep out all the air held in the chips and released during the penetration period.

The difference between 4.18 and 5.10% then represented the partial pressure of nitrogen remaining in the digester. The close agreement of the latter two cooks suggested that the true equilibrium of SO_2 over water had been reached. So far as amount of SO_2 remaining in the digester at equilibrium was concerned, it appeared that an acid with 7.5 to 8.0% total SO_2 of which 1.25% was combined was the strongest that could be used with 95 pounds pressure and a temperature of 135 C.

After temperature reached maximum, there was no further relief until the blow-down, and decrease in chemical in that period was due to combination with the lignin. Since all cooks dropped to a constant value, 3.4 to 3.5%, more chemical

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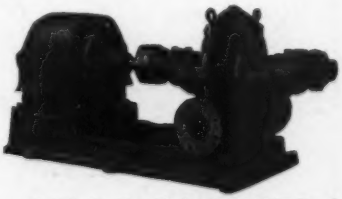

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CENTRIFUGAL PUMPS

Table I.—Acid Concentrations in the Digester During the Cook

	Total	Combined	Total	Combined	Total	Combined
A. Pressure 95 Pounds						
Initial	6.06	1.23	7.58	1.24	8.78	1.27
At 4.5 hours (max. temp.)	4.18	0.70	5.00	0.74	5.10	0.64
At 6.0 hours	3.68	0.40	3.92	0.34	4.00	0.38
At 7.25 hours (start blow down)	3.40	0.31	3.54	0.28	3.40	0.28
At 8.5 hours (blow test)	0.86	0.18	1.02	0.18	0.70	0.16
B. Pressure 110 Pounds						
Initial	8.07	1.24	9.95	1.26	11.60	1.24
Start of relief	6.10	0.70	7.64	0.86	8.44	0.78
At 4.5 hours (max. temp.)	5.48	0.60	5.80	0.58	5.88	0.54
At 5.5 hours	4.80	0.36	5.06	0.38	4.75	0.35
At 6.5 hours (start blow down)	4.44	0.28	4.43	0.31	4.56	0.24
At 7.75 hours (blow test)	1.34	0.21	1.25	0.23	0.98	0.16

was consumed in the cooks starting with stronger acid. Bleach demand decreased in regular order of increasing chemical consumption, which confirmed a more thorough lignum removal with increased chemical usage.

The blow tests were on the high side, but this is a mechanical matter and a number of things could be done to improve chemical recovery.

In the series using 110 pounds pressure (Table II-B), the same general trends were noted, and due to the higher strength acids, new points appeared. The first acid test was taken when maximum pressure was reached and relief started. Difference in acid test between the start of the cook and start of relief was due to penetration of the chemical into the wood, and to dilution of the acid by the wood moisture. Since the wood moisture was the same in all cases, the dilution factor would be nearly constant. Differences in acid test should, therefore, reflect the amount of chemical absorbed by the wood in each case. The decrease in acid tests were 1.97, 2.31, and 3.16% for the respective initial acids of 8.07, 9.95, and 11.60%. There was little difference in the first two, but a marked increase in the case of the strongest acid.

At the end of the relief, a small difference was found in the equilibrium acid concentrations, the weakest acid having 5.48% SO_2 left, and the two stronger ones 5.80 and 5.88% respectively. Here even the weakest acid had a large volume of relief and very nearly swept all the air out of the digester.

At the start of the blow down, all cooks had again come to a common concentration in the range of 4.43 to 4.56%. The amount of chemical absorbed from the liquor during the cooking period was approximately constant but when the amount absorbed during the penetration period was added, the total amounts used were in direct proportion to the initial concentration and in inverse proportion to the bleach demands of the pulps. In these stronger acids the differences in amount of chemical left in the digester at equilibrium diminished, but the differences in amount absorbed in penetration was large.

Since cooks at a given pressure were duplicates except for acid concentration, the difference in bleach demands of the pulps was a measure of the difference in rates of cooking. In the 95-pound cooks, the bleach demands (Table II-A) were in uniform inverse proportion to the concentration of the acid left in the digester when maximum temperature was reached. In ascending strengths of initial acids the bleach demands were 11.2, 8.8, and 8.0%, and the respective equilibrium acids will be recalled as 4.18, 5.00, and 5.10%. As already pointed out, more sulphur was consumed from the stronger acids during the cooking period, and lignin removal was proportionately greater.

The rate of cooking did not show the same leveling off in the 110-pound cooks (Table II-B). As already pointed out, the difference in sulphur usage among these cooks was due to difference in absorption by the wood in the penetration period, although there was a small difference, in addition, of the equilibrium acid strengths between the two weaker acids. The almost uniform drop in bleach demands from 8.5 to 7.7 to 6.5%, was again but a reflection of the increased chemical usage in proportion to increased initial acid strength.

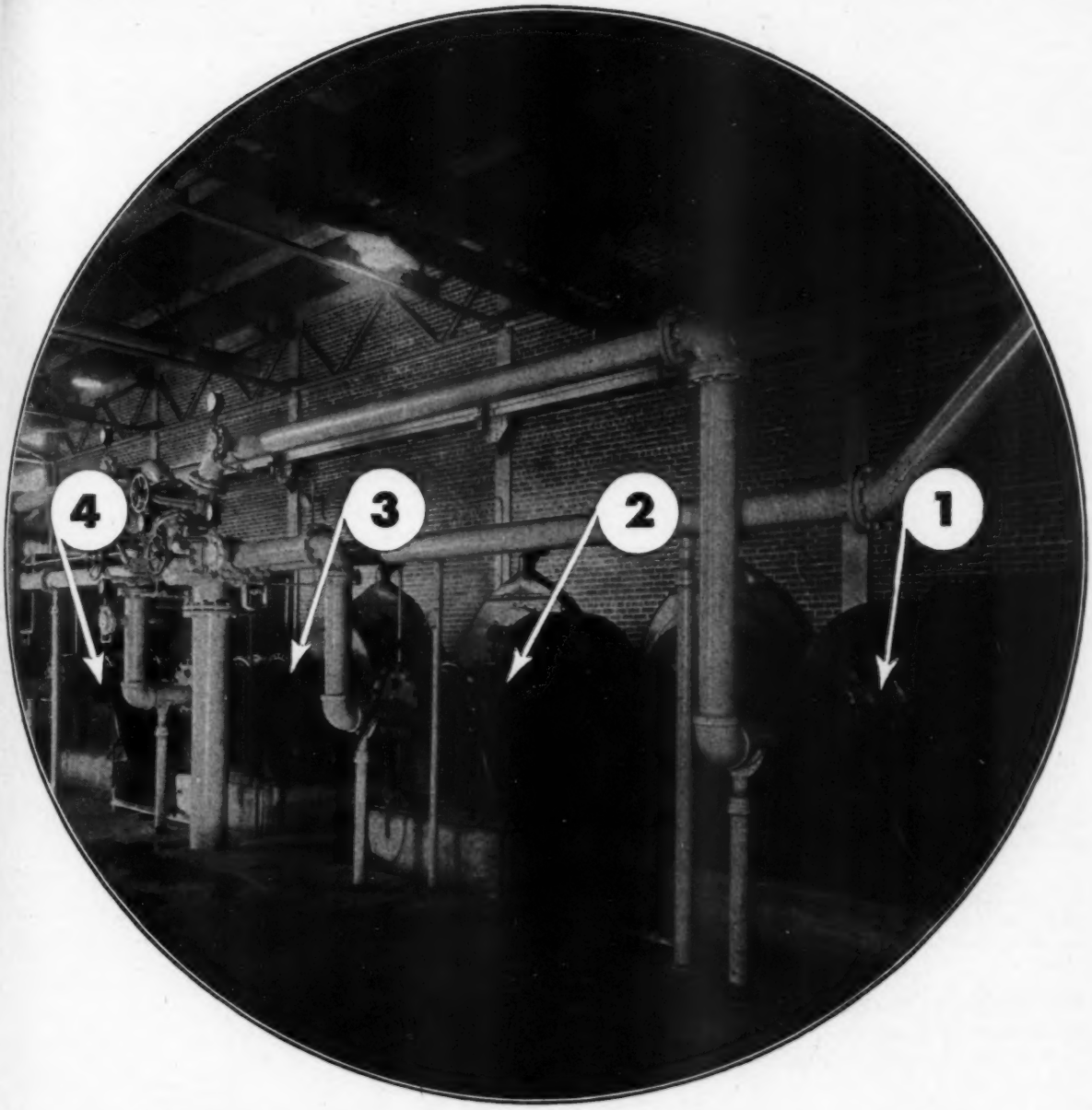
It was interesting to compare the bleachability of the 8.07% acid cook of the 110 pound series with the 7.58 and the 8.78% acid cooks of the 95 pound series. The respective bleach demands were 8.5, 8.8, and 8.0% in almost strictly inverse proportion to the initial acid strengths. However, the 110 pound cook had a total time 45 minutes shorter than the 95 pound cooks. This interlocking of the two series showed that the increase of 15 pounds pressure, when there was sufficient

Table II.—Cooking Conditions and Pulp Characteristics

A. Pressure 95 Pounds			
Maximum temperature, °C.	135	135	135
Maximum pressure, lbs.	95	95	95
Total time, hrs.	8.5	8.5	8.5
Initial acid total SO_2 %	6.06	7.58	8.78
free SO_2 %	4.84	6.34	7.51
combined SO_2 %	1.23	1.24	1.27
Bleach demand, % Cl_2	11.2	8.8	8.0
Screened pulp yield, %	46.5	46.8	46.5
Screenings, %	1.8	1.3	1.5
B. Pressure 110 Pounds			
Maximum temperature, °C.	135	135	135
Maximum pressure, lbs.	110	110	110
Total time, hrs.	7.75	7.75	7.75
Initial acid total SO_2 %	8.07	9.95	11.60
free SO_2 %	6.83	8.69	10.34
combined SO_2 %	1.24	1.26	1.24
Bleach demand, % Cl_2	8.8	7.7	6.5
Screened pulp yield, %	47.5	47.2	47.7
Screenings, %	0.6	0.75	0.6

Table III.—Pulp Strength Tests

Cook	6.06% SO_2	7.58% SO_2	8.78% SO_2
A. Pressure 95 Pounds			
Bursting Strength, %			
Initial	63	60	58
At 400 ml. freeness	156	163	159
At maximum	164	165	167
Tearing resistance			
Initial	2.26	2.50	2.62
At 400 ml. freeness	1.32	1.11	1.02
At maximum burst	1.19	1.09	1.00
B. Pressure 110 Pounds			
Cook	8.07% SO_2	9.95% SO_2	11.60% SO_2
Bursting Strength, %			
Initial	75	72	75
At 400 ml. freeness	160	158	159
At maximum	162	160	164
Tearing resistance			
Initial	2.26	2.36	2.20
At 400 ml. freeness	1.09	1.26	1.16
At maximum burst	1.04	1.18	1.06



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chemical in the digester, saved 45 minutes cooking time.

In neither series did the screened pulp yield change. In one there was a variation of only 0.3%, in the other 0.5%, both within the limit of accuracy of the procedure. The yield remained constant in each series in spite of the fact that the bleach demand dropped 3% in one and 2% in the other. This behavior suggests that in the range of bleach demand covered here the attack on the carbohydrates was dominated by the time and temperature of the cook, and to a lesser extent by the degree to which the pulp was cooked.

Each series was made with a separate sample of wood, and the yields of the two were not strictly comparable with each other. With this reservation, it may be pointed out that in the 110 pound series, cooked at the same temperature as the 95 pound series but 45 minutes less time, the yield averaged nearly 1% higher although the pulps are definitely softer. In any event, cooking to produce a softer pulp with high chemical concentration has had less harmful effect on yield than the same change in pulp hardness would have had if produced by an increase of temperature.

The percentage screenings was calculated on the basis of screened pulp as is general mill practice. In the 95 pound series, the amounts were normal and showed no trend. In the 110 pound series, the amounts are low possibly due to better penetration by the stronger acid.

In general, it may be said that the pulp strengths of both series were normal for the conditions and for this species. The only unusual point was the uniformity throughout each series despite the drop in bleach demand. Here, again, is evidence of the milder action of cooking by chemical concentration than by heat.

There has been more than one confirmation of the above work on full mill scale operation.

The Nature of the Lignin in Redwood Bark

F. E. BRAUNS[1] and H. F. LEWIS[1]

Redwood bark is separated commercially by the Pacific Lumber Company of Scotia, California into two fractions, the "bark fiber" and the "bark dust."

The "bark fiber" is inherently a cellulose fiber.

The "bark dust" represents a heterogeneous mixture of broken fibers and parenchyma cells, together with a large amount of the phenolic acid found in the fiber. This particular substance probably makes up 70-80% of the bark dust.

(1) Research Associate, The Institute of Paper Chemistry.

TABLE I—Chemical Data on the Redwood Bark Fiber Cook

Cook Number	Original Fiber	Soda Cooks					Sulphite Cook
		I	II	III	IV	V	VI
Pretreatment		None	None	Recook of I	Prechlorination	Alcohol-extracted	
Cooking: Temperature (°C.)		160	180	160	160	160	135
Conditions: Time, hr.		1	1.5	1	1	1	5
NaOH, %		10	20	22	14	12.5	*
Pulp yield, %	100	50.7	41.3	96.5	42.2	65.5	51.0
Screenings, %		9.1	1.6	...	5.0	8.6	17.0
Lignin in pulp, %	41.8	31.9	21.6	28.1	25.4	30.9	31.8
OCH_3 in lignin, %	10.0	14.3	14.0	14.6	...	...	10.4

(*) Commercial sulphite liquor with 5.8% total and 4.5% free SO_2.

In the following investigation, the "fiber lignin" and "dust lignin" were investigated separately.

Because there is a relatively large background of information in the literature regarding alkali lignin, the alkali cooking process was used to separate lignin and the high molecular weight organic acids from the fibrous cellulose. Following the cook, the resulting alkali black liquor was acidified, which precipitated the dissolved bark alkali lignin and acids. After purification, these were characterized by determining their alcoholic and phenolic hydroxyls and carboxyl groups. The lignin remaining in the pulp was condensed with phenol and the product studied in the same way.

Before the solutions for lignin isolation were prepared, a number of cooks were made with the bark fiber. Two of these (I and II in Table I) were made by cooking with alkali directly, a third represented (III) a recook of the pulp of Cook I, a fourth (IV) was an alkaline cook following prechlorination, a fifth (V) an alkaline cook of alcohol-extracted bark fiber, and the sixth (VI) was a sulphite cook. The cooking conditions, yields and characterization of the pulps are given in Table I.

Of interest in connection with the pulping studies is the very great resistance of the residual lignin in the pulp to delignification by the alkaline pulping solutions. This is seen in the very slight pulping section on recooking Pulp I. The yield of pulp in Cook III was 96.5% of Pulp I, and this pulp still had a lignin content of 28.1%. This lignin had a methoxyl of 14.6, almost identical with the methoxyl content of redwood alkali lignin. Apparently there exists a very stable lignin-carbohydrate linkage in redwood bark, a type of linkage different from that in the wood.

The processes followed with each black liquor were approximately the same; therefore, only the operations used in the treatment of one liquor will be described in detail.

"Lignin" was isolated from the black liquor by acidifying with a slight excess of hydrochloric acid; the brown, flocculent precipitates was centrifuged, washed with distilled water and as much water as possible removed by filtration on a Büchner funnel. The moist precipitate was then dialyzed towards distilled water until the precipitate appeared to be free of hydrochloric acid (5 to 7 days). As the electrolytes were removed, a portion of the lignin formed a colloidal solution; hence, it was necessary to recentrifuge the lignin suspension. The lignin thus recovered was dissolved in dioxane. The supernatent aqueous solution (after removal of the lignin) was evaporated under reduced pressure, and the residual lignin dissolved in dioxane and added to the dioxane solution of the main portion of the lignin.

"Lignin" was isolated from the dark red-brown dioxane solution, after drying over sodium sulphate, by dropping the solution into ether, with vigorous stirring. The product separated as a brown, finely divided powder which was washed several times with dry ether and petroleum ether, and finally dried under reduced pressure at 100 C. The average methoxyl content of the precipitated lignin was 11.6%. Spruce alkali lignin prepared in exactly the same manner contains 14.9% methoxyl.

The alkali-insoluble reduced bark lignin remaining in the pulp after the alkaline cook was separated by the action of 72% sulphuric acid and contained 14.3% methoxyl. It would appear that either some methoxyl splits off during the alkali cook and the partly demethylated lignin thus formed goes into solution or that there are at least two lignins differing from each other in methoxyl content.

The lignin in the waste liquor of Cook V was similarly isolated but was purified by dropping its solution in anhydrous pyridine into anhydrous ether. The methoxyl content of this product was 2.7%, indicating the presence in the bark fiber of a relatively large amount of material with a low methoxyl content which is easily removed by the alkaline cooking liquor.

These experiments demonstrate that a mixture of substances are present in the bark fiber which may appear as lignin in the analysis; one is similar to sprucewood lignin as measured by its methoxyl content; a second appears to have one less methoxyl than the first, whereas the third

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has very little methoxyl and is much more soluble in alkaline solutions and, hence, is probably much more acidic. The products were purified from any contaminating carbohydrates by dissolving in dioxane, in which the carbohydrates are insoluble, and pouring the dioxane solution into ether, thus precipitating the lignin.

The lignins from the black liquors of two cooks were methylated with diazomethane and dimethyl sulphate and acetylated with acetic anhydride in pyridine. Diazomethane in ether methylates only the acidic hydroxyls (such as the phenolic or carboxylic hydroxyls); dimethyl sulphate with caustic methylates all hydroxyls except those whose methyl derivatives are saponified by the caustic solution (the carboxylic hydroxyls); acetic anhydride in pyridine reacts with all phenolic and alcoholic hydroxyls. By carrying out the appropriate calculations, it is possible to determine the percentage of the different types of hydroxyls in a "lignin" derivative and, hence, to characterize it.

Acetylation of the alkali "lignin" from one of the two cooks, using Brauns' method (Am. Chem. Soc. 61:2120-2127, 1939) gave a product with an acetyl content of 19.5% and a methoxyl content of 9.7%.

The purified lignin was methylated in dioxane with diazomethane by the method of Brauns. The diazomethane-methylated product had a light yellow color, was insoluble in sodium hydroxide, and had a methoxyl content of 22.6%. Diazomethane-methylated spruce alkali lignin has a methoxyl content of 22.2%.

Methylation of redwood bark alkali "lignin" using Brauns' procedure, gave a product which was insoluble in water but soluble in sodium hydroxide solution, indicating the presence of free carboxyl groups.

Since free carboxyls were indicated, this dimethyl sulphate-methylated product was further methylated with diazomethane to a constant methoxyl content. An orange-colored product resulted, having a methoxyl content of 29.5%, substantiating the presence of carboxyl groups.

It is quite apparent that there are at least two types of materials in redwood bark fiber which dissolve in the alkaline cooking liquor and which appear by analysis as lignin and that these are significantly different from the alkali lignin from sprucewood. One of these contains little if any methoxyl but significant percentages of free carboxyl and phenolic hydroxyl groups. It is easily soluble in dilute alkaline solutions, as are its derivatives in which all alcoholic and phenolic hydroxyls are methylated. The second is the product dissolved when the once cooked pulp is recooked. Assuming the removal of the acid in the first cook, a product is found in the black liquor of the recook which still appears to contain a certain amount of carboxyl groups and possibly a somewhat smaller methoxyl content than the original lignin.

It appears that two phenolic acids have been removed, one containing approximately twice the number of phenolic hydroxyl and carboxyl groups as the other and at the same time with only half the number of alcoholic hydroxyls. This tentative interpretation of the calculations is not completely warranted by the facts. Suffice it to say that redwood bark fibers contain large quantities of high molecular weight phenolic acids somewhat related to lignin. These acids resemble humic acids in many ways. They are not present in the living bark but are present in the parenchyma and cork cells of the dead bark and appear to fill the latter. They are also present on the surface of the cell walls of the bark fiber. There is also evidence for the existence of a substance more closely related to lignin, possibly containing small amounts of carboxyl groups. One explanation for these compounds is that the first is a mixture of lignin with a small amount of methoxyl-free humic acid while the second is a mixture of the humic acid with a small amount of lignin.

In addition to the products studied above, there remains in the bark pulp a relatively large amount of material which can be isolated as lignin in the Klason lignin determination with 72% sulphuric acid. This residual lignin contains 14.3% methoxyl—i.e., in the range of 14-15% generally obtained for the methoxyl content of softwood alkali lignins.

Fig. 1—Photomicrograph of a typical bark dust field.

An extensive investigation has been made of this lignin. For some reason, it is not easily removed from the fiber by either the soda or sulphite process, but it does combine with phenol in much the same way as spruce lignin. It may be concluded that ether-insoluble bark phenol lignin is much the same as ether-insoluble spruce phenol lignin.

Fifty per cent of the bark as separated commercially is recovered in the operation as a dust. It is made up of broken fibers, small cells, and the powdered walls of dead parenchyma cells and sieve cells, together with the dried contents of these and the cork cells. Figure 1 is a photomicrograph (30X) of a typical "bark dust" field. Inasmuch as the origin of the dust is much the same as that of a portion of the "bark fiber," we might expect dust and fiber to contain similar components.

Eighty-eight per cent of the dust dissolved quickly in 4% caustic at 160 C.; the solution gave no precipitate with carbon dioxide, which is in direct contrast to the behavior of wood lignin in alkaline black

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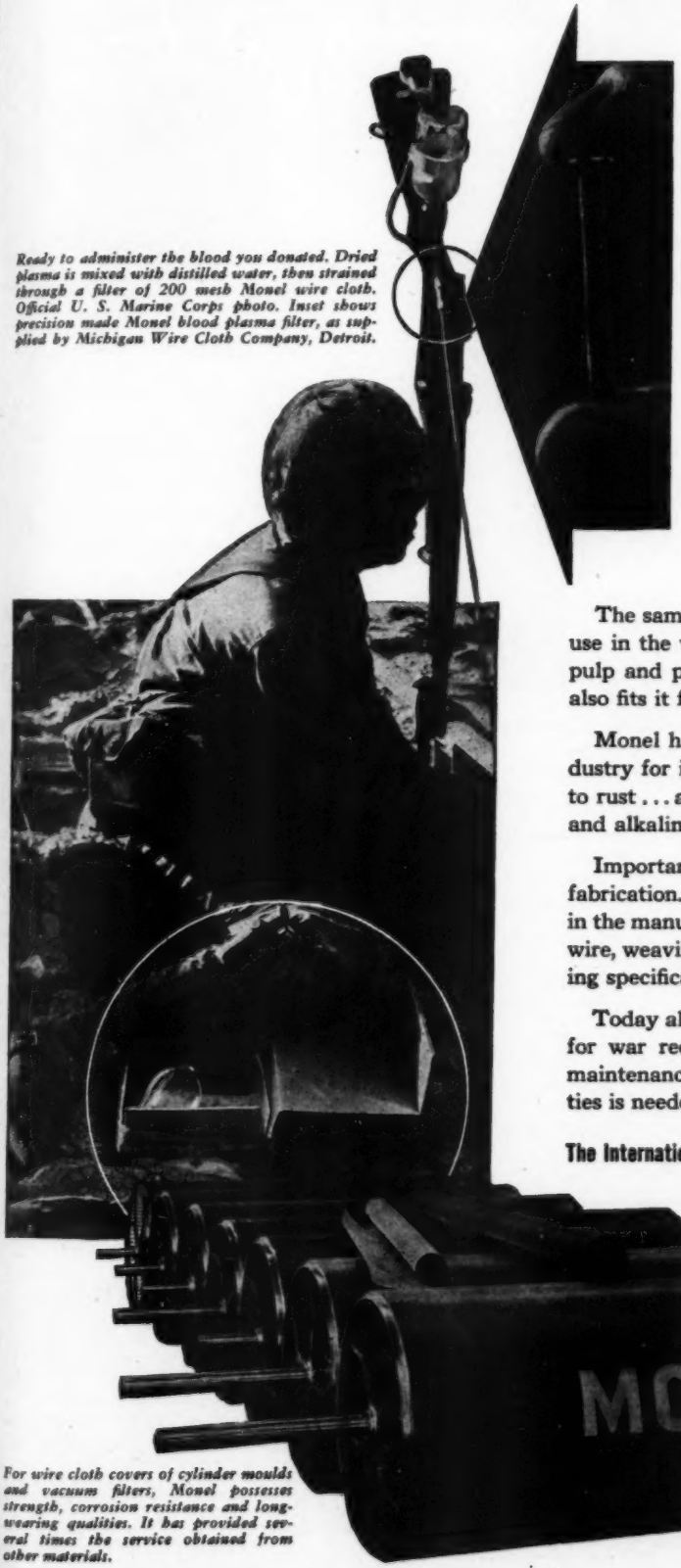

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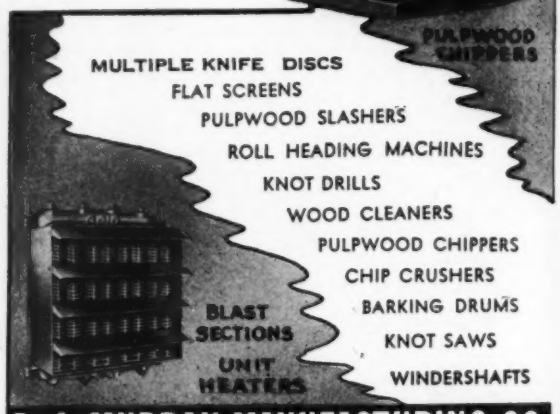

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liquors. On acidification with hydrochloric acid, a voluminous brown precipitate was formed. Thus the dust contains a product which behaves in much the same manner as the material dissolved from the bark fiber by the cooking liquor in Cook V. The methoxyl content of the dust was only 0.08%. The "lignin" content of the dust by analysis with 72% sulphuric acid was 60%. This "lignin" differed from the residual bark lignin as it did not react with phenol in the presence of acid catalysts.

In view of the probable relation between the material in the dust and reacting as lignin and that portion of the fiber dissolved as lignin in Cook V, an attempt was made to isolate and purify the alkali-soluble material reacting as "lignin" in the bark "dust." The "dust" was extracted by cooking under pressure at 110 C. with three separate charges of 1% sodium hydroxide for one hour. The "acid lignin" was precipitated from the alkaline solution by acidifying with hydrochloric acid. The precipitate was removed in the centrifuge and the inorganic content was dialysed against distilled water. As the excess hydrochloric acid was removed, the "acid lignin" formed a colloidal solution; at this point the product was filtered by suction as dry as possible, and the remaining water removed on a porous plate. The product was dissolved in dioxane and the dried solution in dioxane was concentrated under reduced pressure and poured into ether. The precipitate (a dark brown powder) was washed with dry ether and petroleum ether and dried in a desiccator.

Such "acid-lignin" still has an ash content of 0.81%. The "lignin" contained 57.1% carbon and 5.0% hydrogen. The yield of the purified product (calculated on the bark dust) was 22.5%. The low yield results from incomplete precipitation with acid and the difficulty in handling the product. This "acid lignin" as recovered is representative of at least half of the "lignin" compounds in the bark.

The purified product was then methylated by the methods used for bark fiber lignin.

It is apparent from the accumulated data that the purified "acid lignin" is somewhat related to the crude "lignin" removed from the bark fiber in Cook V. It may be considered as a high molecular weight phenolic acid having alcoholic and phenolic hydroxyl groups.

It must be kept in mind that, with a natural product of this type, we are not dealing with a uniform, chemically pure compound but rather with a polymerized product, which probably is changed in composition during isolation. In view of this, it is impossible to say much about a building unit or molecule size. Similarly, we cannot say too much about definite numbers of reactive groups. The data permit our assuming a ratio of aliphatic hydroxyls, phenolic hydroxyls, and carboxyls of 2:4:3 and from this ratio we can establish as minimum molecular weights, a value of 750 from the aliphatic hydroxyls, 835 from the phenolic hydroxyls, and 1000 from the carboxyls. These values are in the range assumed for alkali spruce lignin. The material has many of the characteristics of the so-called "humic acids."

Patents in the Postwar World

CHARLES W. RIVISE, Patent Attorney
Caesar & Rivise

The general public is badly confused on the subject of patents, and many people are inclined to the view that our patent system is in grave danger of being abolished or radically changed.

At one time, I was one of those who feared that the patent system was in grave danger of being radically changed. A reappraisal of the situation and of the many factors involved has caused me to take a calmer view of the matter, and it is now my opinion that there is no imminent danger that the patent system will be radically changed. It is yet too early to relax vigilance; in fact, vigilance never should be relaxed, but all the indications are that our patent system will survive this global war with relatively minor changes.

Proposals for radical changes in the patent laws such as compulsory licensing, and the removal of the safeguard of secrecy as to pending applications, are much

(*) An interference is a proceeding in the Patent Office to determine which one of two or more rival inventors is the first inventor and hence entitled to the patent.

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older than the present administration. The Justice Department started on its crusade against the abuse and illegal use of patents prior to the election of President Roosevelt and long before Thurman Arnold became Assistant Attorney-General. The Supreme Court started on its present trend of invalidating patents and restricting the rights of patentees ten years before there was a single Roosevelt appointee on the bench. Several of the recent adverse decisions were, in fact, written by the more conservative judges. Chief Justice Stone wrote the majority opinion invalidating one of the Marconi Wireless patents, and two of the so-called New Deal judges vigorously dissented.

A great deal of the present antagonism against patents is due to sincere but nevertheless misguided reformers, who blamed the system for certain abuses and illegal practices on the part of a small minority of patent owners. Part of the blame for the adverse criticism of patents must be placed on those patent owners who have endeavored to use their patents as a shield to hide flagrant violations of the anti-trust laws, thereby discrediting the patent system and furnishing the excuse or justification as well as the occasion for many of the attacks.

A fact which seems not to be generally known is that many of the attacks on the patent system have come directly or indirectly from shortsighted industrialists, who sought to destroy or emasculate the system in the belief that they would thereby be enabled to pirate with impunity the inventions of their competitors, but who did not seem to realize that a weakening of the system would also destroy their own patent protection.

There are many signs that lead me to the conclusion that attacks on the patent system are slackening, and that the system will survive the war without any major changes. A straw in the wind is the fact that several Circuit Courts of Appeal have criticized "the flash of genius test" for inventions laid down by the Supreme Court. Another hopeful sign is the fact that the Supreme Court in the last few decisions split sharply on such questions as patent validity and the rights of patentees. Then there is the fact that the President, instead of endeavoring to put into effect the drastic program of patent reform recommended by the Temporary National Economic Committee, appointed a very conservative National Planning Committee to investigate the patent system.

It is very significant that the Commission has presented a very conservative program for patent reform—a program, which, in certain respects, is more conservative than the programs of reform sponsored by the National Association of Manufacturers. The recommendations of the Commission are much more conservative than the program adopted by the American Bar Association.

Within the past few years, certain changes were made in the patent laws in an effort to speed up the process of obtaining a patent.

In the postwar period and perhaps even before the war ends, patent procedure will be further streamlined.

The streamlining of Patent Office procedure and the improvement of the facilities for searching will enable the Examiners to act more promptly and more efficiently on applications. Furthermore, in order to prevent dilatory tactics on the part of applicants, the life of patents will be restricted to twenty years after filing, but in no case more than seventeen years after issuance.

The Patent Office will probably endeavor to raise its standard of patentability to approach the high standards set by the courts. The presumption of validity of issued patents would thereby be raised, but there is a great danger in raising the standard of invention too high. The standard in the courts already is too high and must be lowered to a common-sense level.

If the Patent Office raises its standard too high, the Supreme Court will have very little opportunity to adjust its standard to a reasonable level. For, under present procedure, the validity of a patent cannot be tested until it is granted. Hence, it is my opinion that the Patent Office should resolve every reasonable doubt on the question of patentability in favor of the applicant, and should not apply too strictly the so-called negative rules of invention.

Incidentally the Patent Planning Commission has recommended the enactment by Congress of a declaration of policy that patentability shall be determined objectively by the nature of the contribution to the advancement of the art, and not subjectively by the nature of the process by which the invention may have been accomplished.

Such a declaration of policy would not be of any particular assistance in a large proportion of the cases in the Patent Office. For in many cases the importance of the invention does not fully appear until some time after the patent issues.

Interference procedure* has been considerably simplified in recent years, but hardly enough to meet adverse criticism.

A committee of patent attorneys is sponsoring a bill (H.R. 3264) to abolish interference proceedings in the Patent Office. The Commissioner would select from the interfering applicants the one to receive the patent, and the others would have to institute court action to cancel the patent and to have a second patent issue.

The proponents of the bill contend that the present interference practice constitutes a bottle neck in the Patent Office and delays the issuance of the patent so that it expires later. The difficulty with the argument is that only a handful of patents actually are delayed because of the present interference procedure, and the adoption of the bill, whereby patents would in no case be granted for more than twenty years after filing, would adequately take care of the situation. Furthermore, since the Commissioner would have to decide without the benefit of any testimony who should get the patent, his decision would be a guess, and a second patent would in many instances have to be issued later, perhaps years later.

There are several particularly bad features in the proposed bill. Applicants would have their applications rejected on pending applications as well as on issued patents, and would be entitled to see the rival application without any provision for safeguarding the prior applicant. The Commissioner would be permitted, as previously stated, to issue the patent to one of the applicants, not necessarily the first, and the unlucky party would have to file suit in the district where the successful party resides.

Under the present procedure, testimony is taken before a notary and at the convenience of the parties and witnesses. For instance, the attorneys for the parties may assemble in the office of one of the lawyers or in the plant where the inventor or the

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witnesses work, and witnesses need be called away from their tasks just long enough to testify. The testimony is submitted to a Board of Interference Examiners, who are experienced not only in technical matters, but also in weighing evidence. The parties as a rule have faith and confidence in the Patent Office tribunals, and usually accept their decisions without appeal to the courts. In most cases where appeal has been taken, the original decisions of the Patent Office have been sustained by the courts.

Under the proposed new practice, the unsuccessful applicant in the Patent Office would have to take his witnesses and his exhibits into a strange court, in many cases hundreds or thousands of miles away from his home. In addition to bringing with him a patent attorney who is familiar with the technicalities of the invention, he would have to hire a local lawyer, one whom he does not know and in whom he may have no confidence. The case would be heard by a judge, or a master appointed by the judge, neither of whom would be familiar with the technical subject matter, and there would be interminable delays before a final decision, during which time his rival would have the patent. The expenses connected with the new procedure, to say nothing of legal fees, would make the proceeding a luxury to be enjoyed only by well-financed corporations and their attorneys.

Appellate procedure from decisions of the Patent Office tribunals will probably be simplified.

A single court of patent appeals may finally be established, which will handle appeals in infringement suits from all the eighty-four District Courts. This reform, recommended by the Patents Committee of TAPPI in 1931, will do much toward the establishment of a uniform standard of invention, particularly if the same court of appeals is given jurisdiction of appeals from the Patent Office.

In the more distant future, provision will be made for the revocation or cancellation of improperly issued patents. The Commission recommends that within six months after the issuance of a patent, any member of the public be accorded the opportunity to challenge the validity of the patent by means of a cancellation proceeding. At the present time, a member of the public has no opportunity to challenge a patent, unless he is sued or threatened with a suit for patent infringement. The recommended procedure would be in the Patent Office, and would involve much less expense than a suit in court.

The Patents Committee of the National Association of Manufacturers recommends that instead of revoking or cancelling a patent after it issues, pending applications be thrown open to public inspection before issuance, to permit the public to submit evidence against the grant of the patent. This, I believe, is a very dangerous practice.

In the postwar world the Justice Department undoubtedly will continue its campaign against cartels and the illegal use of patents—but with much less fanfare.

The so-called Kilgore Science Mobilization Bill is concerned with patents only indirectly, and hence I will refer to it briefly. Industrialists and many scientists have been greatly disturbed that the Government may take over all the research facilities of the country. It is my opinion that industry has it in its own power to prevent this by taking the initiative away from the Government. There have admittedly been certain abuses in the past in the use of the results of scientific research, and the excuse as well as the occasion for Governmental interference may be obviated in large measure by the voluntary elimination of the abuses.

There has been a recent tendency on the part of many industrial establishments to attempt to protect their inventions as trade secrets. I feel certain that the trend in the postwar world will be away from trade secrets and toward patents. For, in the usual case, the protection of a patent is much safer and much more certain than that afforded by practicing an invention as a trade secret; and as the attacks on the patent system slacken, the advantages will be more and more in favor of obtaining patent protection.

Patents, therefore, will play a very important role in the period that will follow the war, and the industrial establishment that does not adopt an adequate patent policy will be left behind in the postwar race for new products and new processes.

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Effect of Esterification of Pulp Fibers upon Strength Properties, Hygroscopicity, and Hygroexpansivity of Paper*

JAMES J. HARRISON, Chemist
Ohio Boxboard Company

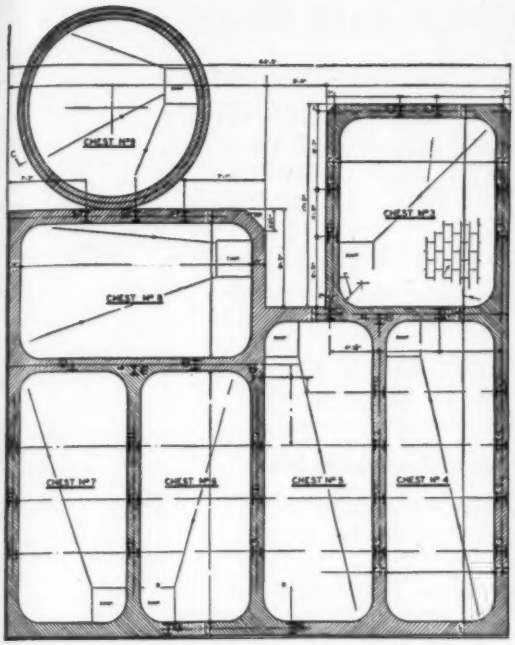
The pronounced affinity of cellulose for water—i.e., its hygroscopicity and ability to swell—is attributed chiefly to the abundance of free hydroxyl groups which it contains. If part or all of these groups are replaced by ester groups, hygroscopicity and swelling ability decrease. For example, Sheppard (*Trans. Faraday Soc.* 29:81, 1923) found that the water-binding capacity of cellulose acetate decreased with increasing acetyl content and that fibrous triacetate took up only 9% water as compared with 16% for unacetylated cotton fibers.

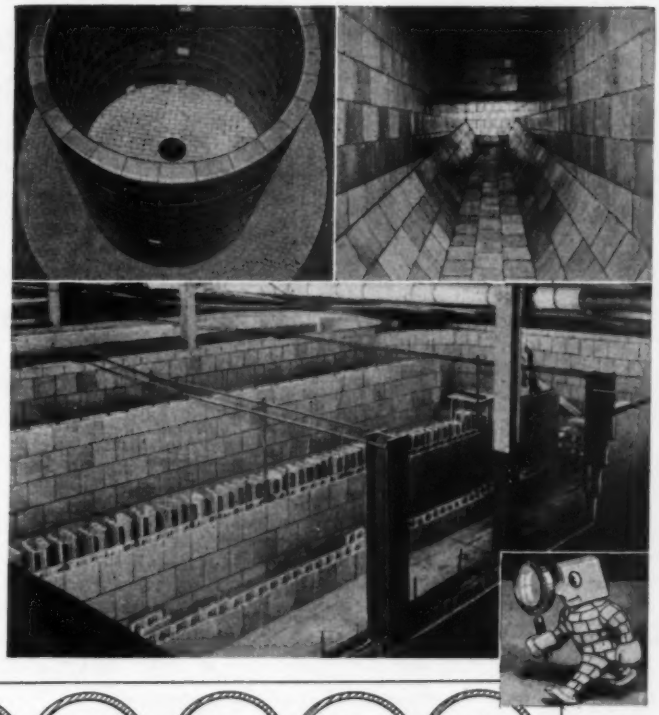
No doubt, the same forces by which the water molecules are held to the hydroxyl groups of cellulose are operative when cellulose fibers are beaten in the presence of water. In the light of Sheppard's results, it is conceivable that hydration and subsequent bonding of the fibers when the water is removed and the sheet is formed would be seriously impeded if part or all of the hydroxyl groups were replaced by ester groups. A direct proof could thus be furnished of the generally accepted view—that water binding and bonding between fibers is a function of the free hydroxyl groups of cellulose.

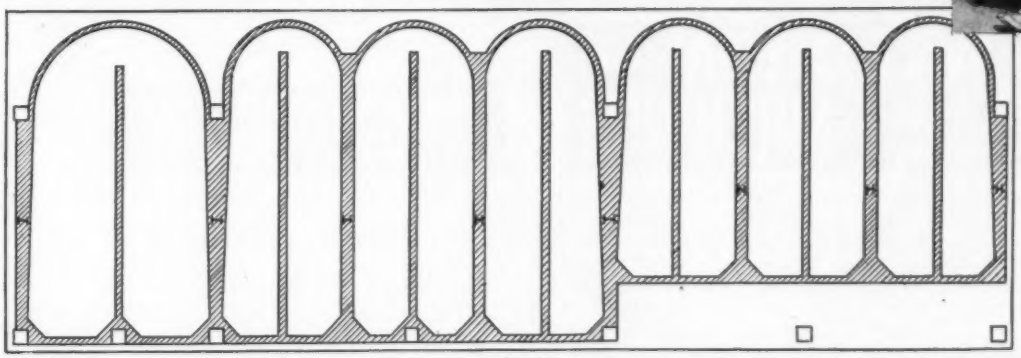
This proof was furnished in the two first papers of this series. In the first paper (Bletzinger, J. C., *Ind. Eng. Chem.* 35:474, 1943) it was shown that rag stock fibers which had been partially acetylated without losing their fibrous structure and without degradation of the cellulose, lost their papermaking properties as the acetyl content was increased over 8-9%, fibers having 20-25% acetyl being incompatible with water. However, fibers having acetyl contents below 8-9% gave sheets with increasing physical strength properties as the acetyl content was raised, and attained a maximum at about 6% acetyl content. This phenomenon was explained on the assumption that the beating of cellulose fibers, in which the lateral distances between oriented chain molecules have been increased by the introduction of acetyl groups, renders a greater number of free hydroxyl groups accessible to hydration until, with further introduction of acetyl groups, hydration is counteracted and eventually overpowered by the hydrophobic character of the more highly acetylated fibers.

It was shown also that sheets of excellent physical properties and uniformity were obtained from these more highly acetylated fibers when the water was replaced by acetone as a beating and sheet-forming medium. This result was ex-

(*) A portion of a thesis presented in partial fulfillment of the requirements of The Institute of Paper Chemistry for the Degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., May, 1943. This work was carried out under the direction of E. Heuser.







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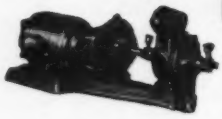

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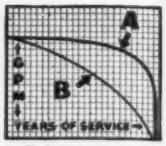

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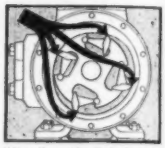

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plained by the solvation of the acetyl groups by the acetone (in analogy with the hydration of hydroxyl groups by water in unacetylated fibers) and the development of bonding forces between the acetyl groups of adjacent fibers when the acetone was evaporated and the sheet was formed.

In the second paper (Aiken, W. H., *Ind. Eng. Chem.* 35:1206, 1943) these results were generally confirmed by a study of another rag stock material as well as a bleached Mitscherlich pulp prepared from sprucewood. In addition, it was shown that the maximum in physical strength properties was obtained by merely subjecting the fibers to defibration (in the British disintegrator)—i.e., without actual beating, although the maximum was less pronounced than on beating. Furthermore, the coincidence between the maximum in physical strength properties and the maximum in hygroscopicity of the acetylated fibers, which was to be expected on the basis of the hypothesis advanced above, was actually observed; this hygroscopicity maximum was found for acetylated fibers which had not undergone even the process of defibration. Hence, it appeared that the mere opening of the micellar structure of the fibers on the introduction of acetyl groups sufficed to increase the accessibility of free hydroxyl groups to an extent which permitted the fibers to absorb more moisture from the surrounding atmosphere. With increasing acetyl content, however, the fibers became more and more hydrophobic, and the hygroscopicity dropped to lower values.

It would be expected that the hygroscopic behavior of the acetylated fibers would be reflected in a sheet prepared from such fibers and that, in addition, the hygroexpansivity—i.e., its ability to expand with increasing moisture absorption — would change accordingly. Since the physical strength properties, the hygroscopicity, and the hygroexpansivity of a sheet of paper are all a function of the hydroxyl groups of cellulose, it would be expected also that a direct relationship between these three characteristics would exist and that this relationship would, in turn, correlate with the acetyl content of the sheets.

In view of the observation that the hygroscopicity of cellulase esters decreases with the chain length of the acyl radical (Sheppard, S. E., and Newsome, P. T., *J. Phys. Chem.*, 39:143, 1935), it seemed logical to expect that the hygroscopicity of sheets of paper prepared from fibers with increasing acyl chain length would be reduced in a similar manner and that hygroexpansivity and physical strength properties of such sheets would follow the same trend. In addition, it could be expected that, by introducing longer acyl chains, a lower degree of esterification than that required in the case of acetylation would suffice to produce similar changes in the three characteristics of the sheet.

The present study deals with the relationship between these three characteristics of handsheets prepared from acetylated, butyrylated and stearoylated pulp fibers.

The investigations were carried out with bleached Mitscherlich pulp.

The fibers were acetylated with acetic anhydride and pyridine, using the modified method of Hess and Ljubitsch as employed by Bletzinger and Aiken.

The usual methods available for preparing cellulose butyrates (i.e., using butyryl chloride or butyric anhydride and an acid catalyst are not suitable, if degration of the cellulose is to be avoided. Therefore, the Hess and Ljubitsch method was adapted to the present work by using a mixture of butyric anhydride and pyridine. The procedures and conditions were similar to those employed for acetylation.

Cellulose stearates were prepared according to the method of Grün and Wittka (*Z. angew. Chem.* 34:645, 1921), i.e., the cellulosic material was heated with a mixture of stearoyl chloride and pyridine. To limit the degration of the cellulose, the temperature was allowed not to rise higher than 40 C.

The Eberstadt method as modified by Genung and Mallatt (*Ing. Eng. Chem. Anal. Ed.* 13:369, 1941) was used for determining the acetyl and butyryl contents of the preparations; a suspension of the sample in aqueous alcohol was saponified with sodium hydroxide and the unconsumed alkali determined by titration with hydrochloric acid.

Difficulties were encountered in determining the stearoyl content of the preparations with sufficient accuracy. The values obtained appeared to be much too high, even after the preparations had been thoroughly extracted. Grün and Wittka encountered similar difficulties and, therefore,

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resorted to the extraction of the stearic acid, after saponification and acidification, and its subsequent gravimetric determination, a technique which was used by subsequent investigators and also in the present investigation. The values thus obtained checked within 1% with each other.

The degree of polymerization (D.P.) of the acetylated and butyrylated fibers was derived from specific viscosity measurements in cuprammonium hydroxide, using Studinger's viscosity-molecular weight function.

Difficulties were encountered in determining the D.P. of the stearoylated fibers by the method described above. The esterified fibers were insoluble in cuprammonium hydroxide, which confirms the observation of Grün and Wittka. But, strangely enough, the cellulose preparations regenerated from the esterified fibers by saponification also were insoluble in cuprammonium hydroxide, and none of the swelling pretreatments (with strong alkalies and acids) which were applied to the regenerated preparations was capable of restoring their lost reactivity. Because all ester preparations were insoluble in the usual organic solvents, the common methods of determining the specific viscosity of cellulose esters in organic solvents could not be used either.

In accordance with the procedure used by Aiken, the original pulp, as well as the esterified fibers, were beaten in a Lampén mill.

The procedure for beating described in the Second Report of the Pulp Evaluation Committee of the Technical Section of the Paper Makers' Association of Great Britain and Ireland (Second report of the pulp evaluation committee to the Technical Section, especially p. 153-158. London, Paper Makers' Association of Great Britain and Ireland, 1936) was followed, with the exception that, after disintegration, the pulp was concentrated by filtering on a Büchner funnel instead of using a screen thickener. A charge of 18 grams (oven-dry pulp basis) was used, and the consistency was maintained at 3%. All the materials were soaked in the processing medium for at least 12 hours prior to beating.

It appeared that the maximum strength for the original pulp was reached between 20 and 40 minutes beating and that the acylated pulps developed their maximum strength very close to the 40-minute beating interval.

The sheets prepared from the esterified pulps were formed, pressed, dried, and conditioned according to TAPPI Standard T 205 m-40. Likewise, the sheets were tested according to TAPPI Standards for basis weight (T 410 m-41), caliper (T 411 m-36), and for tearing (T 414 m-40), bursting (T 403 m-36), and tensile strengths (T 404 m-41). Trimmings from the tested sheets were used for the determination of the moisture content.

The hygroscopicity of the esterified and unesterified materials at various relative humidities was determined by the method used by Aiken and the hygroexpansivity with the new Neenah expansimeter developed by Van den Akkar, Root, and Wink (*Paper Trade J.* 115, no. 24:33-36, Dec. 10, 1042; *Tech. Assoc. Papers* 25:351, 1942).

The maxima in bursting and tensile strengths were attained when the acetyl content was between 6 and 8%; in fact, the strength properties were even above those of the original material until an acetyl content of about 10% was reached. The maximum were more pronounced with the beaten than with the unbeaten material. Likewise, as previously observed, the acetylated fibers became more and more hydrophobic as the degree of substitution was increased, and were more difficult to break up and to beat. Microscopic observation of the acetylated fibers (acetyl contents of 25.6% and higher) after beating showed that they had become powdery and had been broken rather than fibrillated. Furthermore, they did not show the usual brushed-out ends but remained more or less blunt. The fact that the higher acetylated fibers were broken and had little tendency to fibrillate obviously added to the lack of strength development observed when these pulps were beaten in water.

The hygroscopicity of both the unbeaten and the beaten samples increased with the introduction of small amounts of acetyl and reached a maximum, which was followed by a rather rapid decrease as more hydroxyl groups were replaced. With a few exceptions, the beaten stock appeared to have a slightly higher moisture content at a given acetyl content than the unbeaten material. The maximum for the unbeaten materials was reached at an acetyl content of 4.6%.

For the beaten materials, the hygroscopicity maximum, which was somewhat less sharp, occurred at the same acetyl content (4.6%).

To demonstrate the existence of the expected relation between the hygroscopicity and the physical strength properties at various acetyl contents, the bursting strength was selected as the most characteristic of the physical strength properties of the sheets. The range in which the maximum in bursting strength occurred coincided with the maximum in hygroscopocity; with further increase in the acetyl content, both physical strength properties and hygroscopicities dropped in about the same manner.

The relation between hygroscopicity, hygroexpansivity and bursting strength was rather close for the unbeaten materials. The hygroexpansivity first increased and reached a maximum at an acetyl content between 2 and 6%, which is close to the range in which the maximum hygroscopicity and maximum bursting strength were observed. It then fell and followed closely the drop in hygroscopicity and bursting strength as the acetyl content approached the highest value (25.65%). The maximum decrease in hygroexpansivity from that of the unacetylated materials corresponded to a decrease of about 35%. For the beaten materials, the hygroexpansivity dropped sharply above an acetyl content of 18 to 20%. At the highest acetyl content, the value was 0.255%. The maximum reduction in hygroexpansivity was approximately 50%.

In the light of a possible commercial utilization of the reduced hygroexpansivity of a sheet of paper prepared from acetylated fibers, it is unfortunate that, as the hygroexpansivity was reduced, the physical strength properties also decreased. Thus, a reduction in hygroexpansivity of approximately 50%, which would be very appreciable for commercial purposes, was realized only when the physical strength properties were also at a minimum. However, when beaten in acetone, a reduction in hygroexpansivity (amounting to 53% as compared with the sheets prepared from the unacetylated fibers) was realized while the physical strength properties were still fairly good.

The butyrylated pulps processed in water suffered a sharp decrease in bursting strength as the degree of substitution was increased. The difference between the beaten and the unbeaten samples became smaller as the butyryl content was increased.

The presence of between 17 and 21% butyryl (15 to 19% of the hydroxyl groups replaced) had about the same effect on the strength properties as 20 to 25% acetyl (30 to 45% of the hydroxyl groups replaced). Thus, with butyrylation a lower percentage of acyl and a lower degree of substitution sufficed to produce a result equivalent to that obtained with acetylation.

The material containing 22.95% butyryl had a bursting strength of about 31 when beaten for 40 minutes in acetone, as compared with 4.7 when beaten for the same time in water. This demonstrates the beneficial influence of acetone as a beating medium also for the butyrylated pulp. A similar effect was produced when a 5% ben-

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zene-water emulsion was used as a beating medium, a bursting strength of 30.5 being obtained, as compared with a 7.5 when processed for the same time in water.

The hygroscopicity of the butyrylated pulps followed fairly closely the bursting strength values in much the same way as was shown by the acetylated fibers. At a butyryl content of 23%, the reduction amounted to 70% for the unbeaten and to 56% for the beaten materials. The hygroexpansivities followed the same trend. The reduction at a butyryl content of 23% amounted to 62 and 67%, respectively. The butyryl group was thus considerably more efficient than the acetyl group.

Very low bursting strength values indicated that the hydrating and bonding characteristics of the pulp fibers had been largely destroyed by the introduction of even a small amount of stearoyl. The sheets, particularly those prepared from the unbeaten materials, were rather bulky and all were very hydrophobic; even with as little as 4% of the hydroxyl groups replaced (corresponding to a stearoyl content of about 16%), they floated on water. Microscopic observations after beating showed even the low-substituted fibers to be crushed and broken.

Another part of the loss in physical strength may be the result of chemical degradation which probably took place during the esterification of the fibers. However, the indications were that the result was chiefly accounted for by the specific effect of the stearoyl group.

The hygroscopicity dropped rapidly with increasing degree of substitution; this drop was more pronounced than with the butyrylated fibers and particularly more so than with the acetylated fibers at about the same degree of substitution. Conversely, basing the comparison upon the same reduction in hygroscopicity, it was found that a replacement of about 4% of the hydroxyl groups by stearoyl caused approximately the same reduction (about 30%) as a replacement of about 12% by butyryl and of about 28% by acetyl groups.

Likewise, the hygroexpansivity decreased with increasing stearoyl content. The maximum reduction, amounting to 70-75%, occurred when between 20 and 30% of the hydroxyl groups were replaced (corresponding to a stearoyl content of between 50 and 60%). When the results are compared with those obtained with the butyrylated and acetylated materials, the same relationships as pointed out for the reduction in hygroscopicity are recognized. For example, to accomplish a reduction in hygroexpansivity of about 60%, a replacement of about 16% was sufficient in the case of the stearoylated materials, whereas the butyrylated materials required a replacement of about 22 and the acetylated materials have required a replacement of more than 43%.

The hope that such reductions could be accomplished without too much loss in strength by processing the stearoylated fibers in an organic liquid could not be realized. Numerous organic solvents were tried and although some of them exerted a distinct swelling effect upon the stearoylated fibers, no bonding between adjacent fibers was accomplished.

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NEW EQUIPMENT AND SUPPLIES

Combustion Control Equipment

Leeds and Northrup Company, 4934 Stenton Ave., Philadelphia 44, Pa., has announced Type P Combustion Control Equipment for application to boilers in smaller industrial power plants. The equipment, applicable to boilers fired with coal, oil or gas, continuously proportions fuel and air to steam demand, and at the same time controls furnace pressure. To regulate fuel-feed and draft (either forced or induced), the system provides a simple electrical balance by which the settings of valves, dampers or vanes are varied in definite proportion to steam demand as directed by a master controller. The remaining draft damper or other device is simultaneously regulated by a furnace pressure controller.

If full automatic control is not desired, any of the drive units can be moved from push button stations. This independent operation of drive units allow the controllers to be serviced without interrupting boiler operation.

Except for drive units, all equipment can be shipped on an easy to install panel; or, if preferred, equipment can be mounted on a complete boiler panel along with draft gauges and other instruments. Drive units are connected to panel by simple conduits.

Constant Level Lubricator

Oil-Rite Corporation, 3495 South 13th St., Milwaukee 7, Wis., has announced a constant level lubricator under the designation of Type J. This unit, offering an automatically controlled visible oiling method for most types of bearings, is available in four standard sizes with capacities of 2, 4, 8 and 16 ounces.

When the reservoir of the lubricator is filled with oil, only enough oil will be released from the reservoir to bring the level in the bearing oilwell to the oil level line marked on the base of the lubricator. When the bearing oil level falls, air is admitted into the reservoir through a vent, thus releasing automatically just enough oil to restore the original level.

Conveyor-Elevator

Chain Belt Company, Milwaukee, Wis., has announced a conveyor-elevator system, the *Rex Uni-Flo*, for the mass handling of free-flowing bulk materials. The conveying unit consists of a chain belt equipped with closely-spaced scraper-carrier flights, and a casing for housing it. The scraper-carrier flights cover the entire cross-section area of the casing-interior. Operating at relatively slow speed, the unit can convey materials horizontally, vertically, or at any angle.

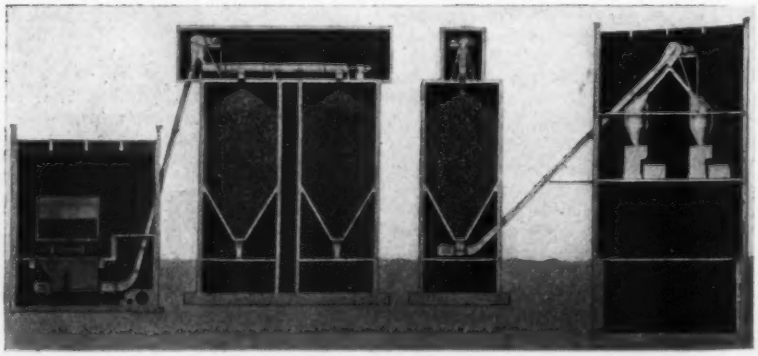
The manufacturer suggests its use for the handling of such materials as alum, china clay, coal, lime, salt cake, sawdust, soda ash, starch, sulphur, talc, titanium dioxide and wood chips.

Fire Extinguisher

National Powder Extinguisher Corporation, 50 Rockefeller Plaza, New York City, has announced the *All-Out* fire extinguisher.

This extinguisher, weighing 37 lb. fully charged, ejects a stream of dry chemical which, when activated by heat, forms a dense, fire-smothering cloud over a flaming area up to 18 ft. The chemical is a non-conductor of electricity; it also is harmless both to humans and equipment.

Both the extinguisher and the extinguishing agent, according to the announcement, have been tested and approved by the Associated Factory Mutual Laboratories on burning oils and on alcohol and gasoline fires.



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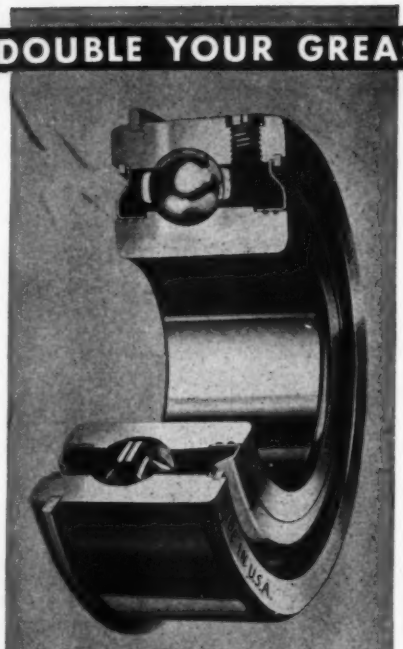

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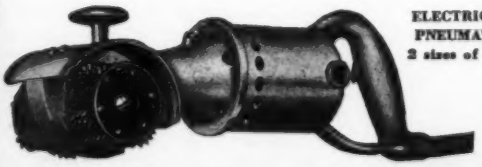

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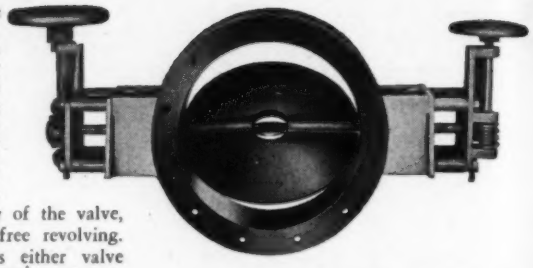


R-S Products Corporation, Wayne Junction, Philadelphia 44, Pa., has developed Type No. 608 butterfly valve (patent applied for) for close control and shut-off of volume and pressure. The larger of two beveled vanes seats itself against the body of the valve, while the smaller vane is free revolving. Hand-wheel control permits either valve to be opened or closed. The valve is available in various combinations of sizes and for operating pressures of 15 to 900 psi.

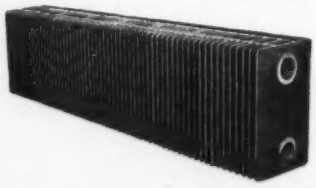
Magnetic Floor Sweeper

The Stearns Magnetic Floor Sweeper, a portable, light scrap picking magnet for use on factory floors and similar surfaces that must be cleared of nails, screws, washers, etc., has been announced by the Stearns Magnetic Mfg. Co., Milwaukee 4, Wis.

The unit consists of a permanently magnetized drum mounted on an anti-friction bearing-equipped chassis. The drum revolves with an 18-in. working face, making it practical for sweeping in and around machinery and yet wide enough for fast cleaning in open spaces.

Fin-Type Cast Iron Heating Section

D. J. Murray Manufacturing Co., Wausau, Wis., has announced that it has been granted a patent on a "fin" heating section



for unit heaters, blast coils and radiation equipment. This section is made in one piece of high-test cast iron. The trade name *Grid* is used to designate unit heaters and blast coilers using the new section.

Protective Skin Cream

Cadet Creme Company, 151 Farrar Ave., Worcester, Mass., has announced *Cadet Skin Cote* as a non-irritating and non-sensitizing cream for protecting the skin against industrial and other irritants. According to the manufacturer, stains and dyes, alkali and acid solutions, grime and other materials do not affect or irritate the skin if the cream is used. The cream is available in tubes, glass jars, and in bulk containers.

Large Air-Volume Fan

Chelsea Fan & Blower Co., Inc., Irvington, N. J., has announced the *Air Blaster*, a fan which delivers a large volume of air in a straight line to the spot where it is desired. The unit consists of a heavy gauge

welded steel housing, mounted on an adjustable pedestal which may be tilted 60 degrees up or down, a direct-connected ball bearing motor, and a fan blade of heavy steel, die cut, die formed and perfectly balanced. Sizes of the unit are as follows: 18 in., ¾ hp. motor, 6,000 cfm; 24 in., 1½ hp. motor, 9,000 cfm; and 30 in., 1½ hp. motor, 11,000 cfm.

Circular Slide Rule

A 6-in. diameter slide rule, designated as the *Monitor*, has been announced by Tayella Sales Company, 27 West Broadway, New York 7, N. Y. The front side of the rule has four scales—Log, C, D, and CI or C inverted; the reverse side, the sine and tangent scales and A and D scale for finding squares and square roots. The scales are finely graduated black lines on white vinylite.

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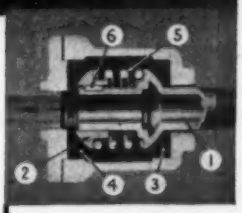

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Waste Liquors as Raw Materials in Synthesizing Protein

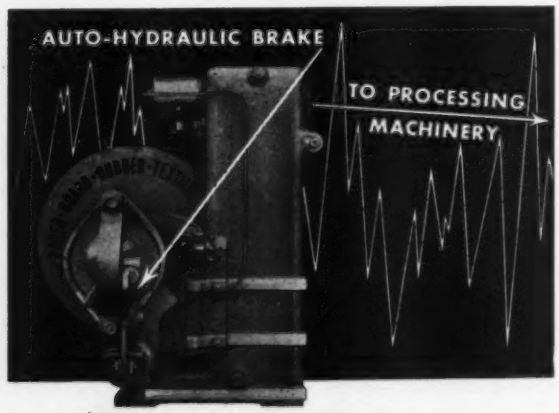
The author gives details regarding two fungi (which are termed "Mycelpilz-biosyn I" and "II," but for which no identifying scientific names are given). These can synthesize protein that can be used as foodstuffs from waste liquors, provided proper precautions are taken. Of the two, I acts only on dilute liquors containing about 1% reducing sugars. The other grows well in liquors containing up to 2.5% sugars. Either I or II may be used in converting "slops" into protein. The differences between these organisms and *torula utilis*, which is used in Germany in producing feedstuffs from sugars obtained from wood, are discussed. Whereas the pretreatment of the liquors is qualitatively similar, the new organisms have much lower phosphate nutrient requirements, and do not need the addition of potassium or magnesium salts. They form the mycelia, which are thread-like structures, and thus permit a clean-cut separation between the protein (i.e. the growing organism) and the liquid. Washing is also simplified. The pressed mycelia are stable, very palatable and may be used in vegetable sausage manufacture. The protein also contains appreciable amounts of diamino-acid groups, which are commonly lacking in protein of plant origin. Max Ernst Peukert. Cellulosechem. 21, 32-34 (1943).

Lignite Pulp by the Use of Chlorite

This gives the results of experiments recently made in Germany on the utilization of lignites in pulping and is one of a series of articles dealing with sodium chlorite as a pulping agent. Certain lignites gave a good grade of chlorite pulp, but in general, lignite cannot be considered a satisfactory raw material for the pulp industry because of great variations in composition, even when taken from the same deposit. Under the best conditions a lignite gave 42% pulp, with 87% alpha-cellulose, degree of polymerization of about 800, and a folding endurance of 2050 double folds. Sulphate cooks from the same sample gave less satisfactory results, despite a somewhat higher alpha cellulose content in the pulp (which was obtained in only 24% yield). In the chlorite treatment, small chips, free from dust were used and given a chlorite-hydrochloric acid treatment over a period of one to two days, at 20 to 60 degrees C. The surface action was rapid, but, unless defibering was resorted to, penetration was not satisfactory. The chlorite consumption also was quite high, and the chlorite had to be added gradually to avoid the effects of a strongly exothermic reaction. The authors give a series of photomicrographs, as well as tabulated data. F. Reiff and A. W. Sohn. Papier-Fabr. Wochbl. Papierfabr. 1943, No. 3, 83-7.

Acetylation and Its Effect on Water-Binding Properties of Cellulose

When rag stock is partially acetylated and sheets are prepared from the beaten stock, the strength properties of the sheet reach a maximum after a relatively small amount of aceytl has been introduced. From that point on the strength drops rapidly with the introduction of more acetyl groups. These results were confirmed using a second rag stock and also with sulphite pulp (from spruce). There was a coincidence between maximum physical properties and maximum hygroscopicity. Highly acetylated cellulose fibers, however, may be converted into a satisfactory sheet of paper provided the beating and sheet forming medium is acetone, and not water. The effects of adding xylan (and acetylated xylan) to the acetylated pulp were studied. Apparently in-



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creasing effects of non-cellulosic carbohydrates result from the mutual bonding between their hydroxyl groups and those of the cellulose. If these groups, however, are covered by acetyl groups, the addition of the pentosan (acetylated) does not give any strength increase. William H. Aiken. Ind. Eng. Chem. 35, 1206 (1943).

Operating Factors Important in Sizing

Sizing difficulties encountered in mill practice are discussed together with methods for overcoming them. Process waters may be important. For example, a water with an initial *p*H of 7.8 and 130 parts per million of carbon dioxide on standing reached a *p*H of 8.2 and 117 ppm of carbon dioxide. This water was less satisfactory to the mill than was one having *p*H 6.9 and 160 ppm carbon dioxide which showed no change in composition after standing 48 hours. The storage of rosin in direct sunlight must be avoided. Such storage may increase the unsaponifiable matter and substances insoluble in petroleum ether, whereas the desirable saponifiables may show a very marked decrease, with accompanying loss in sizing properties. In a well prepared HAGOID size, the particles in the suspension were distributed about as follows: 5% between 0.5 and 0.7 microns, 20% between 0.8 and 1.0 micron, 60% between 1.1 and 1.5; and 15% between 1.7 and 2.5 microns. When rosin substitutes were used as sizing agents, there were marked variations in optimum *p*H. The author illustrates the wide differences by means of examples used in German mill practice. At times such substitutes showed a falling off of sizing quality with time. White sheets may become yellow and colored papers were off shade. Beater operations leading to satisfactory sizing are discussed briefly. For example, when temperatures rise above 38 C, flocculation and poor sizing may result. The *p*H of white waters should be controlled, and ordinarily should range between 5.5 and 6.5. The strike-through of papers, the white waters of which had a *p*H of about 7.0, was 25% higher than with papers in which the white waters had been in the *p*H range of 5.8-6.0. An even steam distribution must be maintained throughout the drying cylinders. In one mill, an unusually high size consumption during the summer could be traced to a faulty operation at the dry end of the paper machine. Close control of rosin and alum consumption are always of primary importance. Otto Wurz. Papier-Fabr. 41, 1-3 (1943).

Systematic Identification of Starches

Tests for the differential analysis of starches are similar to those proposed by Reichert (Carnegie Inst. Publication 173). The latter examined 350 different starches and gave tabulated data. When the degree of polarization, intensity of color reactions with iodine, and with dyes, the temperature of gelatinization and the effects of chemical swelling agents on the starch grains are determined with analytical precision, they can be used successfully in the accurate comparison of numerous types and varieties of starches. Previously the author had examined microscopically many starches including buckwheat, sago, tapioca, yam, acorn, horsechestnut, arrowroot, and starches from leguminous seeds, etc. These same starches were studied using the techniques of Reichert and the results are tabulated. They substantiate Reichert's findings. F. D. Armitage. Inc. Chem. 19, No. 222, 383 (July 1943) through B. I. P. C. 14, 28 (1943).

Norelac—a Possible New Synthetic Coating Material

The Northern Regional Research Laboratory of the U. S. Dept. of Agriculture has developed a new coating material. It is an ethylene diamine polyamide of fatty acids and may be obtained readily from domestic fats and available chemicals. A preliminary report indicates that it may prove to be a superior protective coating for wood and metal and an adhesive for heat-sealing and laminating paper, glassine, cellophane and other packaging materials. Solvation occurs in alcohols, amines, acids and in chloroform. The article includes tabulated data. J. C. Cowan, A. J. Lewis, and L. B. Falkenburg. Oil and Soap, 21, No. 4, 101-7 (April 1944), through Bull. Inst. Paper Chem. 14, No. 9, 282 (1944).

PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington 4, D. C.

Method of Making Greaseproof Cellulosic Sheet Material

Patent No. 2,293,466. James G. Juhasz, Chicago, Ill., assignor to Maurice J. Wright, Chicago, Ill. No Drawing. Application July 10, 1939. Serial No. 283,649. 1 Claim. (Cl. 92—21). The method which comprises intermixing a composition of flaxseed mucilage and water soluble caseinate with an aqueous dispersion of cellulose pulp, forming the mixture into a sheet, and applying an astringent to the sheet to render the casein insoluble in water.

Manufacture of Paper and Board

Patent No. 2,324,529. Sidney Musher, New York, N. Y., assignor to Musher Foundation, Incorporated, New York, N. Y., a corporation of New York. No drawing. Application June 5, 1939. Serial No. 277,453. 4 Claims. (Cl. 8—115.6). 2. A process of treating a paperboard subject to oxidative deterioration to render the same resistant to oxidative deterioration which comprises passing the board through a trough containing an aqueous bath composed of a major proportion of water and a minor proportion of a starch lecithin mixture, said mixture consisting of a minor proportion of lecithin and a major proportion of starch, and then passing the board over heated rolls at an elevated temperature above 180° F. until dry, the final board containing between about 0.01% and 2% of lecithin.

Process for Producing High Wet Strength Paper

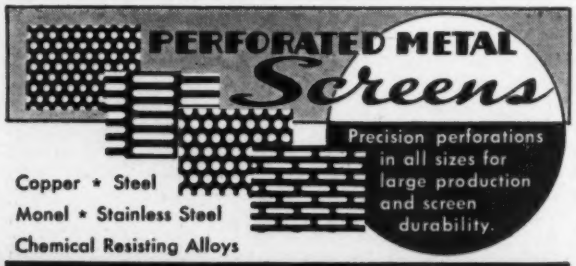
Patent No. 2,322,888. George L. Schwartz, Wilmington, Del., and Joseph F. Walker, Lewiston, N. Y., assignors to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware. No drawing. Application November 16, 1940. Serial No. 365,984. 8 Claims. (Cl. 117—155). 3. The process which comprises treating a web of paper-making fibers with an aqueous solution of polyvinyl alcohol and an ammonium salt of a mineral acid and a water-soluble N-methylol aliphatic compound said solution having a *p*H within the range of 6.1 to 12.5 under conditions that will leave at least 30% moisture in said web, then drying said paper web by heating same for from 30 to 60 seconds at a temperature in excess of 65° C. so as to cause an insolubilizing reaction between the polyvinyl alcohol and the N-methylol compound said temperature being insufficient to cause the drying of the paper web to a degree that said paper web will contain less than 4% moisture.

Process for Making Paper

Patent No. 2,322,185. John Alfred Bicknell, Westbrook, Maine, assignor to S. D. Warren Company, Boston, Mass., a corporation of Massachusetts. No drawing. Application January 22, 1940. Serial No. 315,151. 26 Claims. (Cl. 92—21). 1. Process for the flocculation of finely divided mineral matter suspended in an aqueous medium which comprises dispersing a small amount, compared to the weight of mineral matter in suspension, of karaya gum in said aqueous medium.

Paper-Coating Apparatus

Patent No. 2,320,883. Leonard Parkinson, Park Falls, Wis. Application November 16, 1939. Serial No. 304,771. 3 Claims. (Cl. 91—45). 3. An apparatus for coating a traveling web of paper comprising, a drip trough, means for guiding the web from immediately above said trough and over one edge only, leaving the remainder of the trough exposed, said trough including a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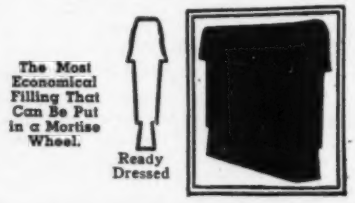
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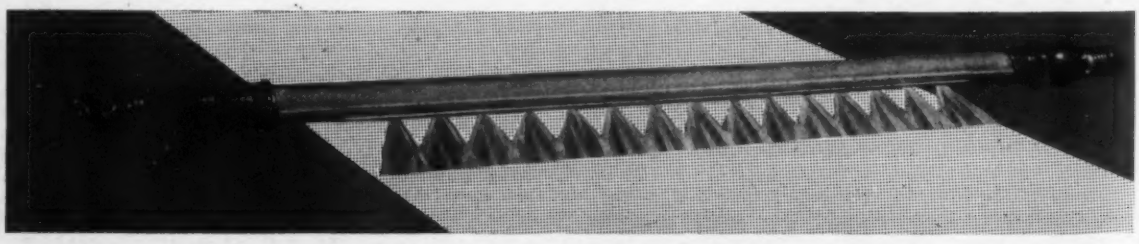
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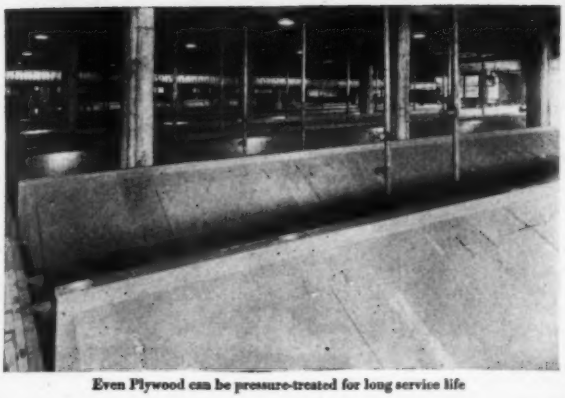
SANDUSKY FOUNDRY & MACHINE CO.
Sandusky, Ohio



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drip plate extending to a point closely adjacent and below the overhung portion of the web, and a spray unit including a splash guard extending transversely of the web above said trough to drain into the same and allow free passage of air between the trough and guard, and spray nozzles extending though said guard for directing jets of coating material against the surface of the web immediately below the drip plate, said drip plate being movable toward and away from the web.

Filler Material for Paint, Rubber, Paper, Etc.

Patent No. 2,323,550. Alan R. Lukens, Belmont, Mass. Application August 3, 1940. Serial No. 350,267. 12 Claims. (Cl. 260—765). 1. A calcium carbonate product in powder form comprising mechanically ground limestone particles of which approximately 99.8% by weight are substantially smaller than fifteen microns in diameter and at least 17% by weight of the particles have a diameter no greater than one micron, the aggregation of particles within the said specified percentages being such as will substantially follow the Rosin-Rammler law of particulate distribution.

Drying Fiberboard and the Like

Patent No. 2,323,918. Joseph F. Kiernan, Brooklyn, N. Y. Application March 26, 1941. Serial No. 385,220. 2 Claims. (Cl. 34—23). 1. The process of drying fiber board comprising feeding said board endwise over supporting rollers, subjecting the surfaces of the board to heat and pressure along all portions of a transverse area extending crosswise of the board, simultaneously supplying currents of drying air to the surface of said sheet at said area, thus progressively bringing the successive fiber layers into more intimate contact with each other and conducting heat inward from each surface, and releasing the pressure on said surfaces to allow said surfaces to expand after the application of said compression, and thereafter circulating said air over the surfaces of the board as it expands to remove moisture therefrom.

Means and Method for Improving the Quality of Paper

Patent No. 2,319,800. Jess R. Denton, Brevard, N. C., assignor to Ecusta Paper Corporation, a corporation of Delaware. Application April 21, 1941. Serial No. 389,586. 9 Claims. (Cl. 92—48). 5. In the production of laid, relatively thin, paper from a continuous moving wet web of paper, the combination of a perforate, woven surface processing roll for first smoothing or conditioning the web by rotative contact therewith, and a laid dandy roll for rotative contact with the conditioned web to provide the laid design therein such that the depth of the laid lines is limited and the areas between lines rendered more opaque and uniform.

Process for Laminating Rubber Hydrochloride to Paper

Patent No. 2,293,568. James E. Snyder, Akron, Ohio, assignor to Wingfoot Corporation, Wilmington, Del., a corporation of Delaware. Application June 22, 1940. Serial No. 341,877. 1 Claim (Cl. 154—2). The continuous process of sealing rubber hydrochloride film approximately .001 inch thick to paper by heat and pressure which comprises directing the heat against the surfaces of the film and paper which are to be united to make the heated surface of the film tacky and to heat the paper, and uniting the film and paper by pressure without heating the opposite surface of the film to the temperature at which it becomes tacky.

Paper Sizing

Patent No. 2,320,771. Paul B. Davidson, Wilkinsburg, Pa., assignor to Strathmore Paper Company, West Springfield, Mass., a corporation of Massachusetts. No drawing. Application December 19, 1939. Serial No. 310,040. 6 Claims. (Cl. 106—135). 2. A paper sizing consisting of an aqueous solution having a density of 2.8 to 4.5 degrees Beaumé and a *p*H of 8.0 to 9.5 and containing 3½ to 8½ per cent of animal glue, an alkali and substantially ½ per cent of borax as a buffering agent for maintaining the solution at said *p*H, and having between substantially ¼ and 1¼ per cent of bentonite suspended therein.

New Catalogues and Publications

The Asbestos Factbook (Second Edition)—This publication, a 16-page booklet, presents information on the origin, location, uses, analyses and qualities of asbestos. It also contains a number of terse factual statements, historical and otherwise, on the same product. The price of the booklet is 10c a copy; the publisher, Asbestos, Inquirer Bldg., Philadelphia 30, Pa.

Chain Belt Company, Milwaukee, Wis.—Bulletin 437, which may be had on request, is descriptive of the Rex Z-Metal chain belts for drive and conveyor service. Rex Z-Metal is a ductile ferrous cast metal with high tensile strength and yield point. It is particularly adapted for use in cast chain belts because of its strength and toughness. While not stainless it resists corrosive action of many acids and alkalis which actively attack malleable iron or steel. Many uses for these belts are described and illustrated, and tables showing average comparative physical properties and relative corrosion resistance will be helpful to the prospective purchaser.

Cochrane Corporation, 17th and Allegheny Ave., Philadelphia, Pa.—Of interest to all steam users, Cochrane Continuous Blow-off Bulletin 4081, illustrated with photos, diagrams and graphs, shows the heat saving that can be accomplished with this system. Free on request.

Corn Industries Research Foundation, 5 East 45th Street, New York 17, N. Y.—This company has issued a reference book, "Corn Facts and Figures," which gives a picture of the importance of corn not only in the American diet, but in relation to American agriculture, marketing agencies, industries and the war effort. Free on request.

Corning Glass Works, Corning, N. Y.—Write to the Industrial Division of this company for Bulletin 838, an informative booklet on Vycor Industrial Glassware for high temperatures, and Bulletin 844, "The Properties of Pyrex Resistant Glass No. 774." In connection with these booklets there are also available, Price List, No. 843, "Pyrex Tubing;" Bulletin 839, "How to Install Pyrex Piping;" "Pyrex Piping Data P-3, Glass Valves for Pyrex Brand Piping," and Pyrex Piping Data P-2, Adaptor Connections for Pyrex Brand Piping."

E. I. du Pont de Nemours and Company, Wilmington, Del.—A brochure setting forth the advantages of "Safety Color Code for Industry," a plan for using color as a visual aid to safety, is being distributed free by the Finishes Division of this company. It is intended to augment "Three Dimensional Seeing," which has proved so valuable in reducing industrial accidents. Illustrations are given for the use High-Visibility Yellow; Alert Orange; Safety Green; Fire Protection Red; Precaution Blue and Traffic White.

Fischer and Porter Co., Hatboro, Pa.—Engineers with flow rate problems can obtain Catalogue 10-B, "A New Era in Flow Rate Measurement" from the above company by addressing them at 946 County Line Road. Its 32 pages contain a discussion of the basic advantages of the Rotameter, including its extremely high accuracy and immunity to variations in viscosity and specific gravity. Large semi-humorous illustrations bring out various points. It also contains a list of fluids which have been handled successfully, and some typical installations. Gratis.

General Electric Company, Schenectady, N. Y.—Publication Number Gea-4214, is descriptive of its electronic relay, No. CR7511-A. Illustrations of its operation and typical applications are also included.

B. F. Goodrich Company, Akron, O.—The Chemical Division of this company has just issued an attractive folder, available on request, descriptive of a recently developed group of polyvinyl resins and plastics, with the trade name Geon. An outline is given of the characteristics of the four Geon resins and Geon plastics. A partial list of applications for these resins and plastics, including electrical service, extruded products, gaskets and packings, as protective coatings, for coated fabrics and papers, and calendered and cast sheets and films is also included.

Jeffrey Manufacturing Company, Columbus 16, Ohio.—Copies of booklets describing this company's portable car unloader, type 246, and portable scraper conveyor, 242-A will be sent to inquirers. Diagrams and specifications are included.

Leeds and Northrup Company, Philadelphia, Pa.—Its new system of combustion control designed for the smaller industrial or municipal power plant is described in a catalogue, L. & N. Combustion Control, Type P. Schematic illustrations show the application of the system to different types of boilers. Electrical balance action and control of furnace pressure are shown by means of photo-diagrams. The publication also shows how the operator can switch from automatic to semi-automatic control, or can regulate any or all of the various drive units by pushbuttons. For prompt attention to your request for this booklet, address 4934 Stanton Avenue.

Lyon Metal Products, Inc., Aurora, Ill.—This company is sending without charge to inquirers, a booklet, "How One

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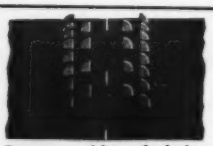

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WANTED—Used paper mill trimmer in good condition. Send description, price, etc. Address Box 355, Fritz Publications, Inc.

WANTED—Slitter operator, Detroit, comply WMC, experienced, $1.10 hour. Address Box 359, Fritz Publications, Inc.

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Company Organized to Handle War Contract Terminations," published as a war service. It has been looked over by Chicago Ordnance, Army Service Forces at Washington and checked by the National Association of Manufacturers. It is a step-by-step, graphic presentation of war contract terminations. It gives a suggested breakdown of termination duties by departments and sets time limits for each department. 14 practice-proved forms designed by Lyon Metal Products, Inc., to expedite the work, are illustrated.

National Paint, Varnish and Lacquer Association, 1500 Rhode Island Avenue, Northwest, Washington, D. C.—If you are interested in preparing for postwar competition in the paint industry, write for booklet, "Ask Yourself," which has been prepared by the Postwar Planning Committee of this association, on CED recommendations. Queries on product development, production, purchasing, finance and accounting, marketing and distribution, personnel and general policy are amusingly illustrated.

New Jersey Zinc Company, 160 Front Street, New York 7, N. Y.—This company is offering through its Market development Division a booklet, "How Zinc Saves Steel from Rusting." It includes government specifications for typical important metal primers, and is intended to be of aid in evaluating the paint coatings which will be offered in the postwar period.

North American Philips Company, Inc., 100 East 42nd Street, New York 17, N. Y.—Just released is a folder descriptive of this company's Norelco Searchray 150, and industrial X-ray unit. The illustrated four-page booklet explains the workings of the unit, and lists its advantages and applications.

Photoswitch Incorporated, 77 Broadway, Cambridge 42, Mass.—The company will answer promptly requests for copies of its new four-page bulletin, 316, describing their Photoswitch Densitometer Series D90. Photos and diagrams show typical applications of this photoelectric control for transparency measurement of liquids, gases, films, filters, plastics and similar materials.

Roots-Connersville Blower Company, Connersville, Ind.—A four-page folder, Bulletin 61-B11, has been issued by this company to describe its Cycloidal Rotary pumps. There are illustrations showing various driving arrangements, including direct coupled electric motors, gasoline and steam engines, in addition to standard arrangements such as a flat belt or V-belt, gear reducers, etc. Cross-sectional views show the three-lobed impellers used in both the RF and SO pumps. A list of typical installations for Cycloidal pumps is included.

Stewart-Warner Corporation, 1826 Diversey Parkway, Chicago.—The Alemite division of this company has just issued four attractive catalogues, covering Alemite LubroMeter Centralized Lubrication System; Alemite Dual Manifold System of Lubrication; Alemite Progressive Lubricating System; Alemite Dual Progressive System. The illustrations define the operation of these systems very clearly.

The Youngstown Miller Company, Sandusky, Ohio.—Now available is Bulletin YM-700 covering this company's new robot refiner. A folder in black and white with a flow chart gives full details on the operation of the robot.

BOOKS

Safety Supervision—Vernon G. Schaefer, Ph. D., Assistant Professor of Psychology in Charge of Supervisory Training in Industry, The Pennsylvania State College, is author of this book. In his preface, Dr. Schaefer states, "The purpose of this book is to discuss the human elements involved in the problems of the supervisor who must promote the safety of the workers in his division." The book treats of the following subjects: Management Responsibility and Safety Promotion; Organization for Safety; Personality and Supervision; Accident Causes and Symptoms; Habits in Relation to Safety; Informing New Men; Attention, Interest, and Attitude; Learning and Safety; The Worker's Aptitude and Ability; Training for Safety; Emotion and Safety; The Maladjusted Worker; The Importance of Suggestion; Fatigue, Monotony, and Accidents; Building Morale; and Discipline, Reward, and Punishment. It is a book of 352 pages (5 in. x 7½ ins.) The price is $2.50 a copy; the publisher, McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 18, New York.

Infrared Spectroscopy, Industrial Applications and Bibliography—R. Bowling Barnes, Robert C. Gore, Urner Liddel, and Van Zandt Williams, each of the Stamford Research Laboratories of the American Cyanamid Company and jointly the authors of this volume, present it as a partial answer to the increasing demand for information concerning the industrial applications of infrared spectroscopy. The book is a work of 236 pages, the latter half of which is given over to an author and a subject bibliography. The first half of the book covers the qualitative and quantitative applications of infrared spectroscopy, experimental equipment and technique, spectrometer, preparation of samples, origin of infrared spectra, intensity of absorption bands, qualitative analysis, quantitative analytical techniques and present status of infrared spectroscopy in industry. It also presents a library of reference curves as well as an empirical formula index and an alphabetical index to the reference curves. Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y., is the publisher. The price is $2.25 a copy.

CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

	per cwt.
Blue Overalls	-5.50
Corduroy, Men's	-3.50
Corduroy, Ladies'	-3.00
Washables, No. 1	-3.00
Percales	-4.75
New Soft Blacks	-3.75
Light Prints, No. 1	-4.50
Khaki Cuttings—	
Bleachable	-4.25
Unbleachable	-3.50
New White Canvas	-6.50
New Mixed Blacks	-3.25
Canton Flannels, Bleached	-7.00
Shirt Cuttings—	
New White No. 1	-7.25
No. 1 White Headings	-7.25
White Shrunk	-5.00
Silesias No. 1	-5.75
New Unbleached	-7.50
Fancy	-3.50
Linen Cuttings—	
American	-5.00
White	-14.00
Grey	-14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowances of $1 to $2 a ton depending on the value of the grade involved.

	per ton
Roofing—	
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shoppers	

ROPE and BAGGING

f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	3.00 to 3.25
Wool Tares—	
Light	3.00 to 3.25
Heavy	3.25 to 3.50
No. 1 Scrap Bagging	2.75 to 3.00
Manila Rope—	
No. 1 large	-*115.00
No. 1 small	-*105.00
Sisal Rope—	
No. 1 large	-*95.00
No. 1 small	-*80.00
New Burlap Cuttings	5.50 to 6.00
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	-*80.00
No. 2 sisal	-*60.00
Soft jute	5.00 to 5.50
Mixed	1.50 to 1.75

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment, with brokers' allowance of 4 to 9 per cent.

	per ton
Shavings—	
White Env. Cuts, One-Cut	67.50-
Hard White Env. Cuts	62.50-
Hard White, No. 1	57.50-
Soft White, No. 1	50.00-
Soft White, One-Cut	47.50-
Soft White, Mise.	43.00-
Fly Leaf, No. 1	33.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Flat Stock—	
Repacked No. 1 Heavy Books and Magazines	33.50-
Mixed Books	17.00-
Ledger Stock—	
No. 1 White	43 50-
No. 1 Mixed (Colored)	37.50-
Manilas—	
New Env. Cuttings	53.00-
New Env. Cuts, One-Cut	47.50-
Extra Manilas	37.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Ground Wood Manila Tab Cards	27.00-
Kraft—	
Envelope Cuttings	65.00-
Mixed Env. or Bag Cuts	55.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	35.00-
News—	
White Blank	33.00-
Overissue	17.00-
No. 1 Baled	15.00-
Old Corrugated Containers	23.00
New Corrugated Cuts	18.00-
Mill Wrappers	17.00-
Box Board Chips	14.50-
No. 1 Mixed Paper	14.00-

CHEMICALS

f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to -
Bleaching Powder—	
Drums, cwt.	2.25 to 3.10
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	24.00 to 24.75
80-100 mesh (bags), lb.	—
Argentine, lb.	20.00—
China Clay—	
Domestic Filler	
Bulk (mine) ton	7.50 to 15.00
Domestic Coating	
Bulk (mine) ton	11.00 to 22.00
Imported (ship side)	
Bulk (lump) ton	14.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	18.25 to 18.50
Litharge, powd., bbl., lb.	.09 to -
Rosin (Gum)—	
New York, per 100 lbs.	
E	5.67-
F	5.80-
G	5.80-
WW	7.20-
Rosin (Wood), carlots	4.18-
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.70 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.72-
Pearl, barrels, cwt.	3.83-
Paper (Sp.) bags, cwt.	3.83-
barrels, cwt.	3.92-
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to ——
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 21.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.03¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	5.60 to 5.85

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo. (West of the Continental Divide and in Denver, Colo., ceilings are $6 per ton lower):

Bleached softwood sulphite	86.00
Unbleached softwood sulphite	74.00
Bleached hardwood sulphite	83.50
Unbleached hardwood sulphite	71.50
Northern bleached sulphate	86.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Northern unbleached sulphate	73.00
Southern unbleached sulphate	63.50
Bleached soda	72.00
Unbleached soda	68.00
Ground wood pulp	50.00
Ground wood—paper machine dried and mutilated	53.00
Sulphite screenings	43.50
Sulphate screenings	38.00
Ground wood screenings	32.00
Northern unbleached sulphate siderums	73.00
Southern unbleached sulphate siderums	63.50
Standard news print siderums	50.00

PAPER

f. o. b. New York City

Boards—	per ton
Binders	84.00-
Chip	48.00-
Chip, tube and can	50.00-
Chip, full-bending	52.50-
Chip, sgl. mls. lined	60.00-
Coated, white patent .018	80.00-
.020 and heavier	75.00-
Kraft liner	62.00-
News	48.00-

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)	
Book, White (M. F.)—	
A Grade E. F	8.25
B Grade E. F	7.80
C Grade E. F	7.55
D Grade E. F	7.30
E Grade E. F	7.05
No. 2 Uncoated Offset 4 sides. White	8.45
Coated White (Trimmed 4 sides)	
No. 1 Glossy	11.90
No. 2 Glossy	10.85
No. 3 Glossy	10.15
No. 4 Glossy	9.80
No 5 Glossy	9.30
C2S Offset	10.40
C1S Litho (Varnish)	10.05
C1S Litho (Non-Varnish)	9.80

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt. 20 lb.	16 lb
Extra 100% Rag	34.00	34.00
100% Rag	28.00	28.00
75% Rag	20.00	20.00
50% Rag	16.00	17.25
25% Rag	14.00	15.00

Rag Content Ledger—	per cwt. Zone 1
Extra 100% Rag	35.00
100% Rag	29.00
85% Rag	26.00
75% Rag	21.00
50% Rag	17.00
25% Rag	15.00

Sulphite Bond—	per cwt. 20 lb.	16 lb.
Air dry, watermarked	12.75	13.70
No. 1 (M. F.) watermarked	9.00	9.70
No. 2 (M. F.) watermarked	8.25	8.85
Plain (M. F.) unwatermarked	7.60	8.20

Sulphite Ledger—	per cwt. Zone 1
No 1 (M. F.) watermarked	10.00
No. 2 (M. F.) watermarked	9.25
Plain (M. F.) unwatermarked	8.60

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50

News—OPA Ceilings	per ton
Rolls, Standard (Contract)	58.00
Rolls, Lightweight (Cont.)	62.00
Rolls (Spot)	(nominal)
Sheets	66.00

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.20
White, No. 2	1.00-
Bleached Anti-Tarnish	1.15-
Colored	—
Anti-Tarnish Kraft	.70-
Manila	.90 to .95
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.60-
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.60-
Toilet, Bleached (M shts.) per cs.	5.65-
Toilet, Unbleached (M shts.) per cs.	4.25-

Towels—	per case
Bleached	3.20 to 3.75
Unbleached	2.60 to 3.05

Wrappings (Kraft)—	per cwt.
Super-Standard	5.25 to 7.65
No. 1 Wrapping	5.00 to 7.40
Standard Wrapping	4.75 to 7.15
Standard Bag	4.37½-

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)

Bleached papers— M.F. & M.G. Waxing,	per cwt.
20 lb. (Carloads only)	7.25 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.50 to 5.75
No. 1 Butchers	5.75 to 6.00
No. 1 Imit. Parch & Dry Fin. Groe. Sulphite 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin. Groe. Sulphite 30 lb.	6.00 to 6.25
Steam Finish, 50 lb.	5.00 to 5.25
Water Finish, 40 lb.	5.50 to 5.75

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	6.00 to 6.50
Envp. Mla., Sub. 16-28 (No. 2)	5.75 to 6.00
Envp. Mla. (Prices based on large sheets untrim'd reammarked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	6.00 to 6.25
No. 2	5.75 to 6.00
M. G. Sulphite and Kraft (other than Waxing)	
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Grade B-20 lb.	6.75 to 7.00

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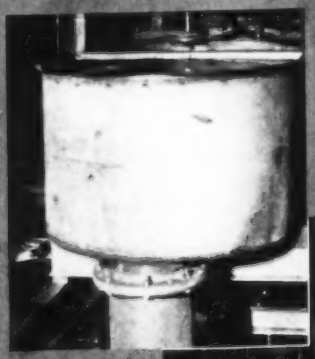

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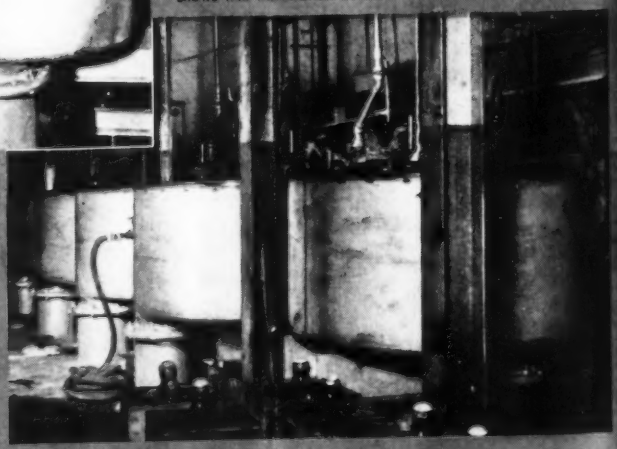
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